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ARMY COMMUNICATIONS-ELECTRONICS ENGINEERING INSTALLAT--ETC F/G 17/7
STANDARD ENGINEERING INSTALLATION PACKAGE AN/TS0-117, AIRCRAFT --ETC(U)
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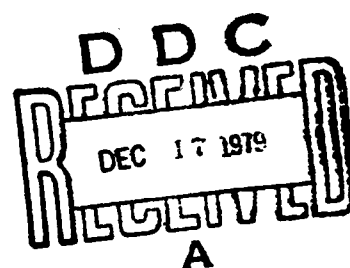
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STANDARD ENGINEERING INSTALLATION PACKAGE

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AN/TSQ-117 AIRCRAFT CONTROL CENTRAL

31 OCTOBER 1979



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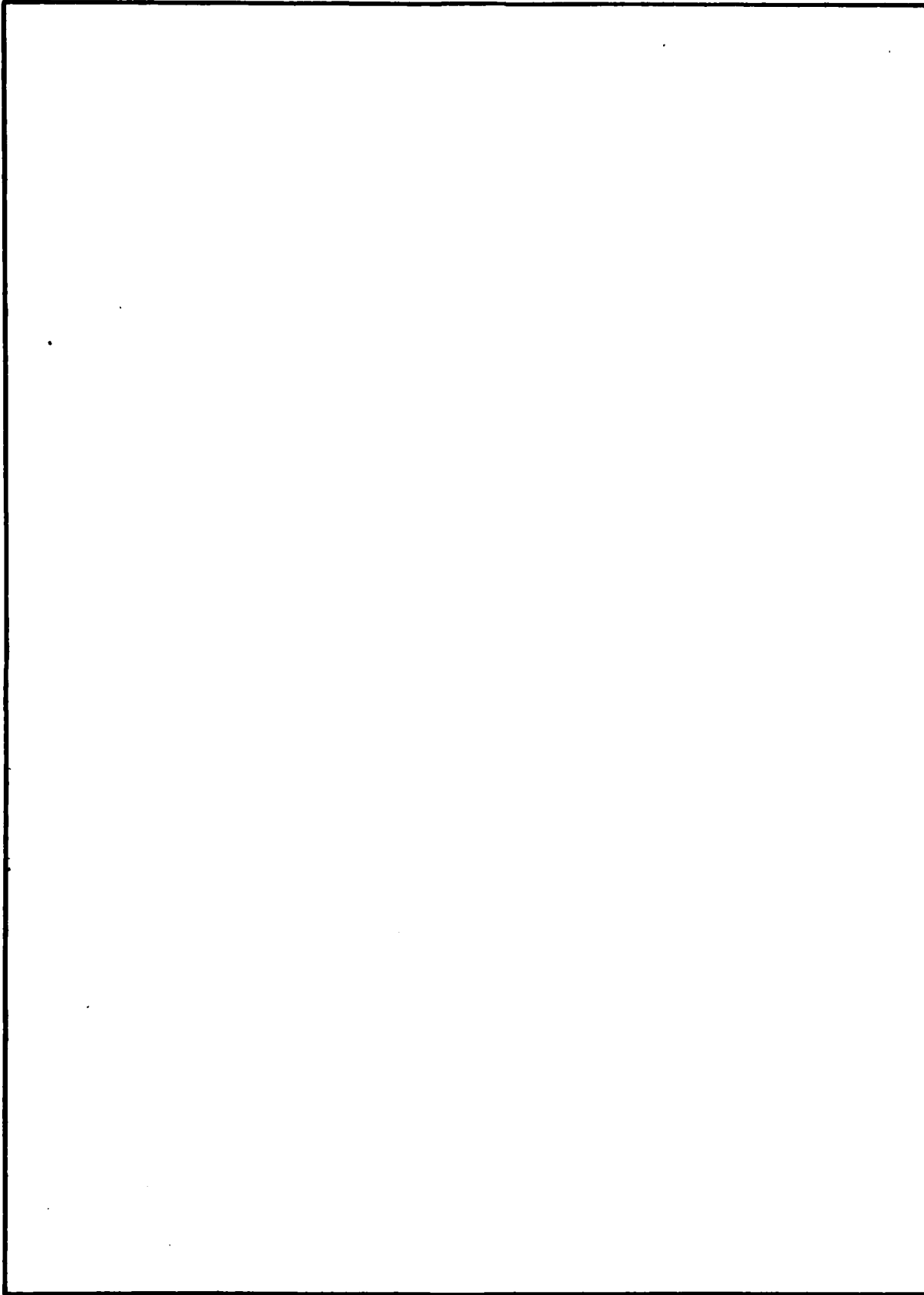
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**HEADQUARTERS
US ARMY COMMUNICATIONS-ELECTRONICS
ENGINEERING INSTALLATION AGENCY
FORT HUACHUCA, ARIZONA 85613**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This standard engineering installation package assists project officers, logisticians, engineers, and technicians to program, procure, engineer, and install the AN/TSQ-117. Document provides a system description with pre-requisites that are essential for effective implementation of the AN/TSQ-117. Document also provides the necessary drawings, bill of materials, and quality assurance. 405 983 x 24		

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NEUTRAL LANGUAGE

The word "he" when used in this publication represents both the masculine and feminine genders, unless specifically stated.

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DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY COMMUNICATIONS-ELECTRONICS
ENGINEERING INSTALLATION AGENCY
Fort Huachuca, Arizona 85613

USACEEIA SEIP
NO. 027

31 October 1979

STANDARD ENGINEERING INSTALLATION PACKAGE
AN/TSQ-117, Aircraft Control Central

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SECTION 1. GENERAL

1.1 PURPOSE AND SCOPE. The AN/TSQ-117, aircraft control central, is used for the upgrade of air traffic control (ATC) and navigational aids at existing US Army airfields and heliports worldwide. It is the purpose of this standard engineering installation package (SEIP) to provide guidance and standard engineering data for the development of an engineering installation package (EIP) for a specific AN/TSQ-117 facility. This SEIP provides installation specifications and instructions, typical installation drawings, a bills of materials (BOM), quality assurance (QA) procedures, test and acceptance procedures, and completion certification format. The information will be adapted for the engineering and installation of a specific AN/TSQ-117 upon a Corps of Engineers designed (STD-AF-0127) tower.

1.1.1 Any deviations from these standards require a waiver by Headquarters, US Army Communications-Electronics Engineering Installation Agency (HQ, USACEEIA) before engineering the variance. Telephone coordination (AUTOVON 879-6356) is to be accomplished before forwarding any correspondence.

1.2 SYSTEM DESCRIPTION. The AN/TSQ-117, a modified AN/TSQ-70A-T1, is an aircraft control central. The control tower cab measures 15 feet long, 8 feet high, and 8 feet wide with enough space for three operators. The upper half of the cab is equipped with tinted glass panels with two tinted glass panels in the front half of the roof.

1.3 LIST OF APPLICABLE DOCUMENTS.

a. Government documents.

Regulations

CCR 702-1-2	USACC Quality Assurance Program for Engineering, Installation and Acceptance of Communications Electronics Equipment and Systems
CCCR 34-2	Preparation of Engineering Installation Packages and Standard Engineering Installation Packages
CCCR 702-2	Preparation of Documentation for Test and Evaluation of Communications-Electronics Materiel

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CCCR 702-3	Role of the Test Director
CCCR 702-4	Quality Assurance During On-Site Installation
CCCR 702-7	Product Assurance Quality Assurance Corrective Actions
USACEIA Bn Pamphlet 105-3	The Communications-Electronics Installation Planning and Implementation Guide
SB 700-20	Army adopted/other items selected for authorization/list of report- able items
Directives	
AFTO 31-10-2 through 31-10-29	Standard Installation Practices
Circulars	
DCAC 370-160-3	Site Survey Data Book for Communications Facilities
Technical bulletin	
TB 95-1	US Army Air Traffic Control and NAVAID Facility Standards
Other Publications	
CCC-TED-75-TP-200	Quality Assurance Evaluation and Technical Acceptance Test of World- Wide Army Airfields/ Heliports Com- munications and Navigational Aids (Revision 2) Test Plan

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1.4 COMMENTS ON PUBLICATION.

1.4.1 Users of this publication are invited to submit recommendations for its improvement. Comments should be keyed to the drawings, page, paragraph, and line of the text for which the change is recommended. For convenience, a mailing card is bound with this SEIP. Comments should be sent directly to the Commander, HQ, USACEEIA, ATTN: CCC-CED-SEP, Fort Huachuca, Arizona 85613.

1.4.2 Requests for USACEEIA regulations and forms should be addressed to the Commander, HQ, USACEEIA, ATTN: CCC-SPT-RM, Fort Huachuca, Arizona 85613.

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SECTION 2. SITE SURVEY DATA AND CHECKLIST

2.1 GENERAL. A site survey checklist is not required for this installation providing adequate site drawings are available at the responsible area.

2.2 SITE SURVEY CRITERIA. The site survey criteria should be conducted in accordance with applicable portions of CCCR 34-2 and DCAC 370-160-3.

SECTION 3. INSTALLATION SPECIFICATIONS AND INSTRUCTIONS

3.1 GENERAL. The instructions outlined in this section provide standard engineering and installation guidance for the installation of the AN/TSQ-117.

3.2 INSTALLATION GENERAL INSTRUCTIONS. The AN/TSQ-117 will be installed in accordance with established criteria, the inclosed engineering drawings and instructions, and referenced drawings and publications deemed necessary by the engineering activity responsible for the project. Installer personnel must be familiar with T.O. 31-10 Series to ensure that the facility conforms to and is installed in accordance with standard installation procedures

3.3 DETAIL INSTRUCTIONS. Instructions are in reference to drawing STD-AF-0190. To preclude repetition of drawing numbers, only the sheet number will be called out when applicable.

3.3.1 Power drawings and wiring diagrams are provided with the AN/TSQ-117 and are not part of this SEIP.

3.3.2 Remove the Taco Antenna from inside the cab and mount the antenna on the rail in accordance with note 403, sheet 4 and 5.

3.3.3 Sheet 1 lists the BOM necessary for the installation of the AN/TSQ-117. BOM item 33 is used with item 6 (not shown on drawings). BOM items 41, 47, and 71 are used at the project engineer's discretion. BOM item 60, not shown on drawings, is used to bundle or brace the coaxial cables and the antenna mast at the roof mounting. BOM items 34 through 37 are provided for ATC coordination system, and detail drawings are not in this SEIP. These items must be determined on a site-to-site basis. BOM items 50 and 69 are explained in note 503, sheet 5.

3.3.4 Sheet 2 shows the AN/TSQ-117 installation details. Note 202 is a general statement and is not shown on the drawing. STD-AF-0207 drawing referenced at the mount of the antenna and in Note 504 of sheet 5 refers to STD-AF-0207 drawings, sheet 1, figures 4 and 7 (rail mounting information).

3.3.5 Sheet 3 shows the cab dimensions and coax cable entrance.

3.3.6 Sheet 2 and 4 show the AN/TSQ-117 installation details for tower base ground system during site support construction phase. ATC operational requirements dictate that no antenna, antenna mast, or other such fixtures will be installed in such a manner to cause a visibility obstruction between the controller and the runway, its approaches, and air traffic pattern. The antenna and antenna mast

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will be mounted above or to the rear of the tower cab and in such a way to present the smallest obstruction to the controller's view from the inside of the cab.

3.3.7 Sheet 5 shows the AN/TSQ-117 tower details. BOM item 49 (not shown on drawings) is used for the antenna mount. BOM item 45 is used for making U-bolts providing BOM items 32 cannot be obtained. All installation above the platform floor grating shown in detail E of sheet 5 is USACEEIA responsibility.

3.3.8 The FM antennas will be mounted on top of the cab structure in the fittings provided.

SECTION 4. ENGINEERING INSTALLATION DRAWINGS

4.1 GENERAL. This section contains only the engineering installation drawings necessary for the installation of the AN/TSQ-117.

4.2 MODIFICATION OF INSTALLATION DRAWINGS. The engineering drawings may be modified during and after installation of a project to reflect adaptation to local physical and environmental conditions. Copies of modified drawings should be retained onsite and changes, corrections, and deletions forwarded to the responsible area's electronics engineering installation agency.

4.2.1 US ARMY COMMUNICATIONS-ELECTRONICS ENGINEERING INSTALLATION AGENCY DRAWINGS. The engineering installation drawings indicated herein show the necessary materials that will be required to accomplish the installation of the AN/TSQ-117. The drawings furnished are 10-1/2 inches by 16 inches, foldout type, and are not in scale format. The scale referenced on these drawings refer to the D size drawings only. Description and application of each sheet number of drawing STD-AF-0190 is:

4.2.1.1 Sheet 1 - Bill of Materials

4.2.1.2 Sheet 2 - AN/TSQ-117 ATC Tower, Installation Details

4.2.1.3 Sheet 3 - AN/TSQ-117 ATC Tower Cab Dimensions

4.2.1.4 Sheet 4 - AN/TSQ-117 ATC Tower Installation Details

4.2.1.5 Sheet 5 - AN/TSQ-117 ATC Tower Details

4.2.2 STD-AF-027, sheet 1, Typical Control Tower Roof Antenna Mounting Layout and Details, is attached for the rail mounting information as stated in paragraph 3.3.4.

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71	16409H	WRAPLOCK, 100' x 1/2"	NSNR
70	02647G	PRODELIN 20-150	5999
	20640D	BOX CONNECTOR, ELEC, 2" THINWALL	NSNR
69	20643G	COMP TYPE, APPLETON 96T200	5999
68	09139K	PAINT, PRIMER COATING, ZINC CHROMATE	8010
67	00569H	16 OZ SPRAY CAN	NSNR
66	07679A	STEEL, SHEET, 4'-25" x 10'-187"	5310
65	15245J	SAAD FAB	5310
64	10233C	(DRILL AS REQUIRED FOR RAIL MTG)	5310
63	00586C	WASHER, FLAT, ROUND, 5/16"	5310
62	10204G	WASHER, LOCK, SPLIT RING, 5/16"	5310
61	15320L	MUT, HEX, STEEL, 5/16"-18	5310
60	07373Q	BOLT, STEEL, 5/16" x 3" NC	5300
59	20647A	WASHER, FLAT, ROUND, 3/8"	5310
58	16204A	WASHER, LOCK, SPLIT RING, 3/8"	5310
57	16205B	MUT, HEX, STEEL, 3/8"-16	5310
56	20638C	CLAMP, ROSE, 15-16"-4" DIA	4730
55	17266M	IDEAL CORP #5556	4730
54	02391P	CLAMP, ROSE, 3"-4" DIA	4730
53	20397C	AE #5-5216640	4730
52	11917E	CLAMP, ROSE, 6"-11" DIA	4730
51	04094R	MS-35842-17	4730
50	19271K	WIRE, 2AWG, THN, RED INSUL	NSNR
49	20397C	WIRE, 2AWG, THN, WHITE INSUL	NSNR
48	11917E	WIRE, 2AWG, THN, BLACK INSUL	NSNR
47	07034Y	CONNECTOR, SEAL TYPE, 1 1/2", GEDNEY 40125	5975
46	20630E	CONDUIT, SEAL TYPE, FLEXIBLE, 1 1/2"	NSNR
45	15267J	CLAMP, COPPER, FOR 5/8" GND ROD	5999
44	02210E	TERMINAL, TELEPHONE, 25 PAIR	NSNR
43	15267J	PROTECTED, RELIABLE ELEC #25FBL	NSNR
42	02210E	2 1/2" 2 1/2" CLIPS	NSNR
41	02210E	PAINT, SPRAY CAN, TAN ORANGE,	8010
40	02210E	13 OZ CAN	8010
39	02210E	CONDUIT, EMT, 2 1/2" x 10' LG ANT MT	9875-08
38	02210E	ROD, GROUND, COPPERWELD, 5/8" x 10'	NSNR
37	02210E	SEALANT, SILICONE RUBBER, 3.7oz TUBE	8030-08
36	02210E	CLAMP, ROSE, 3/4"-2 1/2"	4730-08
35	02210E	ROD, STEEL, THREADED, 3/8"-16, 6' LG	NSNR
34	02210E	TIF WRAP, BLACK, OUTSIDE TYPE 11	NSNR
33	02210E	TIF WRAP, BLACK, OUTSIDE TYPE 7	NSNR
32	02210E	BOLT, SPLIT, FOR 2AWG WIRE	5840-08
31	02210E	TAPE, RUBBER, ADHESIVE, 3/4" x 0.027"	5970-08
30	02210E		
29	02210E		
28	02210E		
27	02210E		
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LIST OF MATERIALS

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REVISION			
ZONE	REV	DESCRIPTION	DATE
	A	ADDED NEW SHEET ONE TO GROUP PLUS REVISED LIST OF MATERIALS	10 FEB 78
	B	REVISED LOM, ADDED NOTE & FIND NO'S	30 MAR 78
	C	CHANGED PER TWG REVIEW	13 MAR 79

D

40	06325F	WIRE, COPPER, AWG 6, THW, INSUL WHITE	6445-00-542-6479	FT	AR
39	02373L	CONDUIT, GALV, RIGID, 1 1/2", 10' LG	5975-00-178-1209	LG	1
38	20707F	AIRCRAFT CONTROL CENTER, AN/TSQ-117	5999-01-056-1076	EA	1
37	17049J	PANEL TYPE 620-A, MECO #2269886	NSNR	EA	1
36	20706E	UNIT, TELEPHONE KEY, 4000, MECO #2202788	5910-00-249-5365	EA	8
35	20705D	SET, TELEPHONE, 830CM-3, MECO #2102986504	NSNR	EA	AR
34	20704C	UNIT, POWER, 7982, MECO #2269886	3020-00-042-4979	EA	1
33	20696E	CABLE, POWER, 4C2 STRANDED	6145-00-643-4641	FT	AR
32	14396L	BOLT, U TYPE, STEEL 5/16" DIA FOR 1 1/2" RIGID CONDUIT	5306-00-894-3418	EA	AR
31	20703B	OUTLET BODY CROUSE-HINDS #BUB-5	NSNR	EA	1
30	20702A	RECEPTACLE, CIRCUIT BREAKING, CROUSE HINDS #ENR 31201	NSNR	EA	1
29	20701Z	OUTLET BODY CROUSE-HINDS #BLB-5	NSNR	EA	1
28	20700W	CABLE FITTING CROUSE-HINDS #CGB-5913	NSNR	EA	1
27	20699H	COVER, BOX, W/GASKET CROUSE-HINDS #BG-68	NSNR	EA	3
26	20708G	OUTLET BODY, CROUSE-HINDS #BT-5	NSNR	EA	1
25	02377A	CONDUIT, RIGID, STEEL 1"	5975-00-178-1218	LG	AR
24	08891Q	REDUCER, RIGID CONDUIT, 1 1/2"-1"	4730-00-227-6994	EA	1
23	11065J	WASHER, LOCK, SPLIT, 1/2"	5310-00-584-5272	EA	AR
22	09141J	WASHER, ROUND, FLAT, 1/2"	5310-00-809-3079	EA	AR
21	21115F	CONNECTOR, COAXIAL, UG-21C OR EQUIV TYPEN	5936-00-241-1948	EA	15
20	07368K	CABLE, COAXIAL, RG-213 OR EQUIV	6145-00-660-6711	FT	AR
19	02376Z	CONDUIT, EMT GALV, 3/4"	5975-00-178-1217	LG	AR
18	02845G	COVER, CONDUIT OUTLET, 2" BLANK TYPE, C-H END	5975-00-158-9485	EA	AR
17	20698G	U-BOLT, 1/2" DIA x 5" LG, INSIDE WIDTH 2-15/16" (WITH 4 HEX NUTS), MCMASTER-CARR #8875137	NSNR	EA	AR
16	19635Z	WASHER, LOCK, INT, TOOTH, 1/4"	5310-00-942-5109	EA	20
15	10668W	WASHER, ROUND, FLAT, 1/4"x.749" OD	5310-00-809-3078	EA	20
14	07481X	NUT, HEX, 1/4"x20	5310-00-761-6882	EA	20
13	07083K	BOLT, STEEL, 1/4"-20x1 1/2" LG	5306-00-042-6920	EA	20
12	02630A	OUTLET, ELEC CONDUIT, 2", C-HLB 67	5975-00-644-3182	EA	AR
11	07452Y	LUG, TERMINAL, BOLT STYLE	5940-00-549-8075	EA	20
10	02372M	CONDUIT, GALV 1 1/2" RIGID TYPE	5975-00-178-1208	LG	AR
9	03672K	CABLE, TELEPHONE, 25 PR	6145-00-577-9064	FT	AR
8	20697F	CABINET, CABLE TERMINATING, 25 PR PROTECTED RELIABLE W3-25FSR	NSNR	EA	1
7	15243L	WIRE, COPPER, BARE, 2 AWG	6145-00-229-9832	FT	AR
6		PLUG, CONNECTOR (SUPPLIED WITH CAB)	NSNR	EA	AR
5	11723H	TAPE, ELECTRICAL 3/4" WIDE 1000V INSUL	5970-00-419-4291	RO	AR
4	02516H	CONDUIT, 2" EMT	5975-00-284-5970	LG	AR
3	20695D	LOCKNUT, BONDING, 1 1/2" FOR RIGID CONDUIT APPLETON #BL-150	5310-00-788-7213	EA	2
2	08997J	SEALING COMPOUND, PUTTY FORM	8030-00-281-2337	BG	1
1	20694C	SAFETY SWITCH, SQUARE D #D223NRB	NSNR	EA	1
ITEM	AEL	DESCRIPTION	PART NO/NSN	UI	QTY

C

B

A

NSNR	KT	I
5975-00-661-007	EA	AR
8010-00-616-9182	CAN	AR
NSNR	PC	AR
5310-00-639-1526	EA	AR
5310-00-407-9566	EA	AR
5310-00-880-7744	EA	AR
5306-00-225-0508	EA	AR
5310-00-809-4061	EA	AR
5310-00-637-9541	EA	AR
5310-00-732-2558	EA	AR
4730-00-132-9844	EA	AR
4730-00-277-7132	EA	AR
4730-00-908-6295	EA	AR
NSNR	FT	AR
NSNR	FT	AR
NSNR	FT	AR
5975-00-913-9184	EA	1
NSNR	FT	AR
5999-00-186-5912	EA	AR
NSNR	EA	AR
8010-00-527-3492	CAN	AR
5975-00-178-6921	EA	2
NSNR	EA	AR
8030-00-674-9875	TUBE	4
4730-00-423-0680	EA	AR
NSNR	EA	2
NSNR	PG	2
NSNR	PG	2
8040-00-238-9032	EA	AR
5970-00-184-7002	RO	AR
PART NO / NSN	UI	QTY

1	2	3	4	5	6	7	8	9	10
C	C	A	C	B					
B	B	A	B	A					
A	A	A	A	A					
1	2	3	4	5	6	7	8	9	10

NEXT ASSEMBLY

USED ON

IDENT NO	STD-AF-0190	ORGANIZATION	U.S. ARMY COMMUNICATIONS-ELECTRONICS ENGINEERING INSTALLATION AGENCY
SHEET NO	104	DATE	30 JAN 78
DESIGNED BY	WHARTON	DATE	10 FEB 78
DRAWN BY	R. RICE	DATE	12 FEB 78
CHECKED BY		DATE	
APPROVED BY		DATE	
DESIGN ACTIVITY	CCC-CEC-SWA	SHEET FROM NO	D 50470
SCALE	NONE	DRAWING NO	
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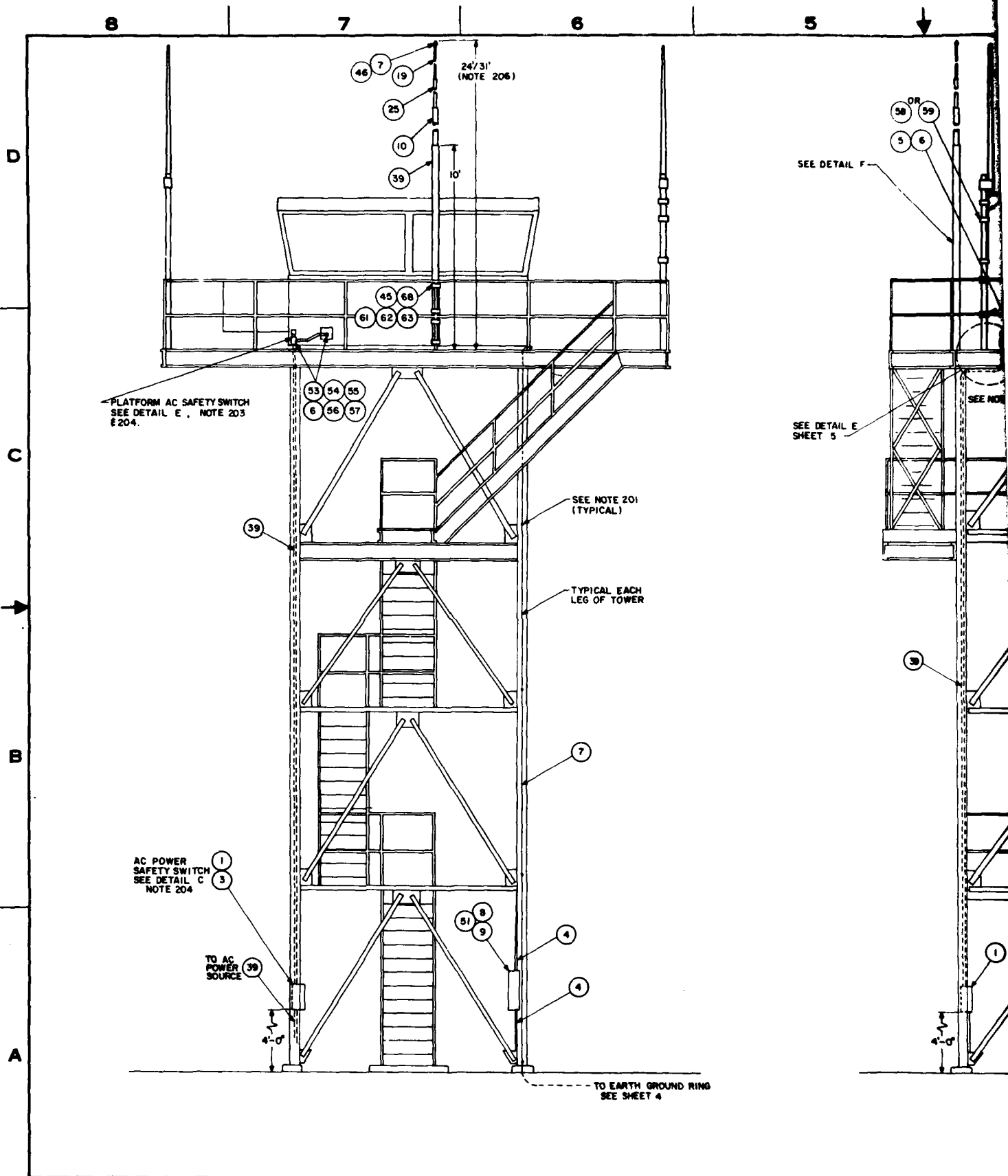
AN/TSQ-117 ATC TOWER
INSTALLATION DETAILS

4

3

2

1



NOTE 205

2

1

REVISIONS				
NO	DATE	DESCRIPTION	DATE	APPROVED
A	17 FEB 78	CHANGED DWG FROM 1 OF 4 TO SHEET 2 OF 5 PLUS GENERAL REVISIONS	711ck	
B	30 MAR 78	ADDED NOTE 208 & FIND NO'S	2000	
C	13 MAR 79	CHANGED PER TWG REVIEW	RyDay	

SEE NOTE 207

34 35 36 37

20 21

TEL CABLE
ENTRANCESEE DWG STD-AF-0207, SHEET 2
FOR GUARDRAIL MOUNTING DETAILS17 SEE DETAIL D, SHEET 5
(TYPICAL 4 CORNERS)2 SEE DETAIL A
SHEET 5SIG CABLE
RUN UNDER
GRATING.

43 44

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RUNWAY →

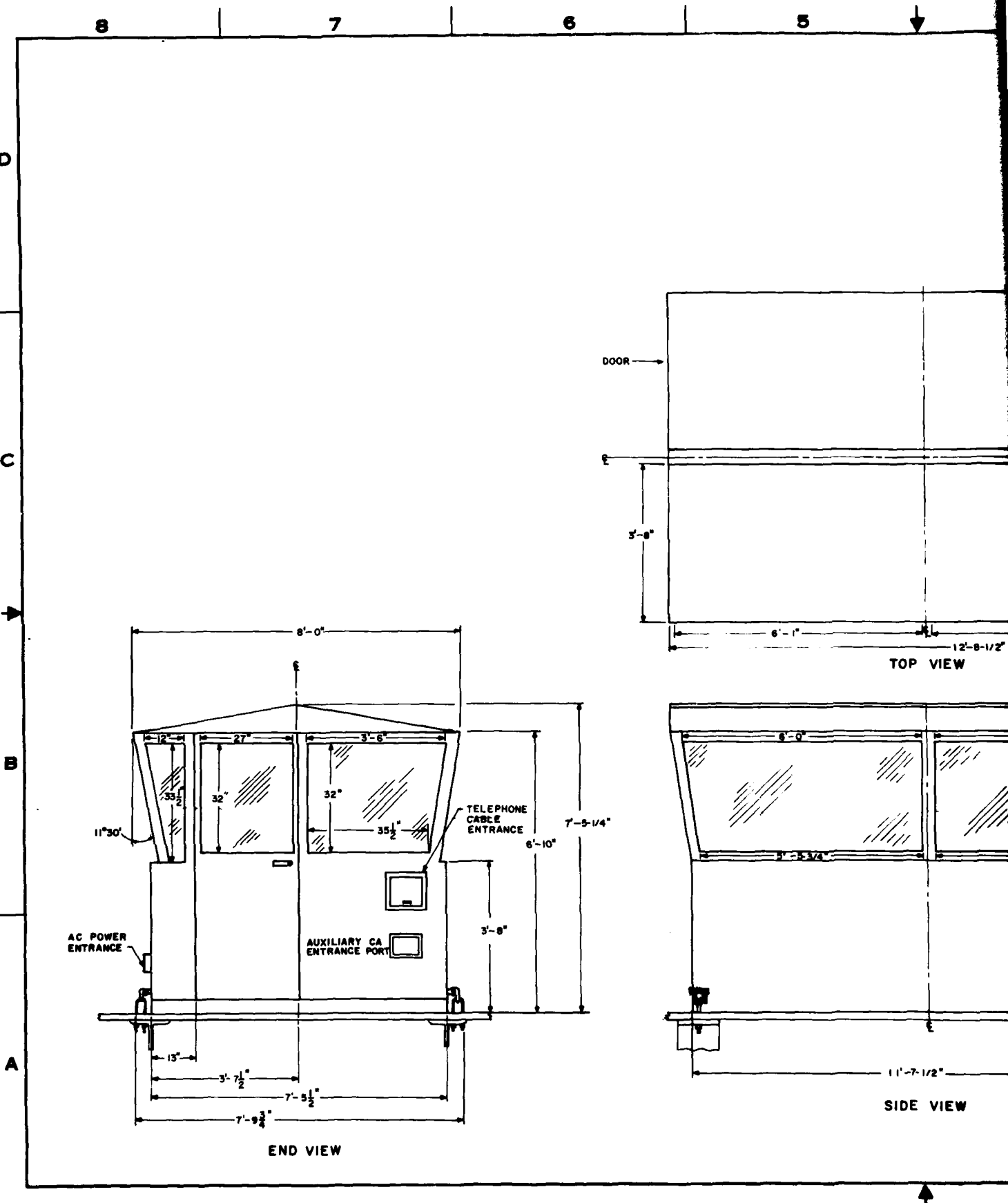
4'-0"

CABLE TO
REMOTE SITES

NOTES:

201. BOND DOWN LEAD TO TOWER LEGS AT EACH LEVEL, SEE DETAIL-B.
202. 120/240V SINGLE PHASE, THREE WIRE, 60Hz, 100 AMP, CROUSE-HINDS CONNECTOR #APZ-1048 IS PART OF CAB POWER ENTRANCE PANEL & IS PACKED SEPARATELY IN CAB. CABLE FOR HOOKUP MUST BE FOR 100AMP SERVICE & COMPATIBLE WITH ABOVE CONNECTOR. (CABLE O.D. 1.575" TO 1.675").
203. PLATFORM AC SAFETY SWITCH MAY BE LOCATED ON PLATFORM AT SIDE OF CAB OR ALTERNATELY AT GUARDRAIL. MAXIMUM AC CABLE RUN ALLOWABLE IS 10 FEET IF AC POWER PANEL IS GUARDRAIL MOUNTED (ITEM 53).
204. NORMALLY INSTALLED BY FACILITY ENGINEER.
205. TACO 2118 / TACO 2218 ANTENNAS ARE PART OF AN/TSQ-117.
206. HEIGHT IS ADJUSTABLE BY TELESOPING SECTIONS MORE OR LESS AT TIME OF INSTALLATION. MINIMUM OVERLAP IS 36", ADJUST TO LOCAL REQUIREMENTS. RAIL MUST BE 42" HIGH AND OF SUFFICIENT STRENGTH TO PROPERLY SUPPORT MAST.
207. TWO EACH ITEM 35 (CALL DIRECTOR) MOUNTED IN CAB. OTHER KEY SYSTEM ITEMS MOUNTED IN OPNS. BLDG OR OTHER NEARBY SHELTER AS REQUIRED BY LOCAL CONDITIONS.

ITEM	DESCRIPTION	NSN	UI	QTY
LIST OF MATERIALS				
STD-AF-0190 SHEET 2 OF 5	USACEEIA-CED FORT HANCOCK, ARIZONA			
DESIGN BY M. WHARTON/THH	AN/TSQ-117 ATC TOWER INSTALLATION DETAILS			
DRAFTSMAN R. J. LEAL				
CHECKER <i>OK RJE</i>				
DATE 14 JUL 77				
CCC-CED-SWA	APPROVAL <i>[Signature]</i>	50470	D	
NO.	SCALE 3/8" = 1'-0"			



REVISIONS				
REV	DATE	DESCRIPTION	DATE	APPROVED
A		CHANGED DIMS FROM SHEET 2 OF 4 TO SHEET 3 OF 5 PLUS GENERAL REVISIONS	10 FEB 78	WAG

AC POWER ENTRANCE

6'-9-3/4"

NOTES:

301. LOCALLY FABRICATED MINI-AWNING SHOULD BE INSTALLED FOR PROTECTING COAXIAL CONNECTORS FROM WEATHER.

COAX CABLE ENTRANCE
(SEE NOTE 301)

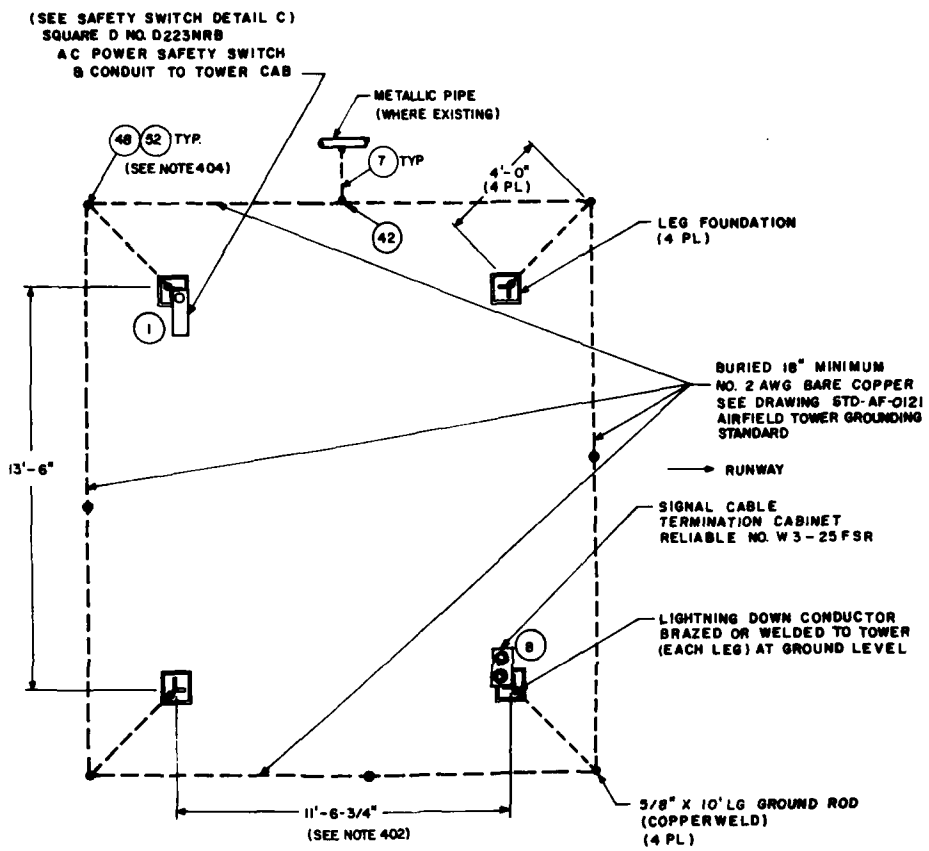
A/C UNIT

32 1/2"

10'-3/8"

ITEM	DESCRIPTION	NSN	UI	QTY
LIST OF MATERIALS				
STD-AF-0190 SHEET 3 OF 5		USACEEIA-CED FORT MONROE, VIRGINIA		
DESIGN BY	M. WHARTON	AN/TSQ-117ATC TOWER CAB DIMENSIONS		
DRAWN BY	S. WAGNER			
CHECKED	WAG			
DATE	13 JUL 77			
CCC-CED-SWA	APPROVAL	DATE FORY NO.	50470	D
PROJECT NO.		SCALE	3/4" = 1'-0"	SHEET OF

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	APPROVED
A		CHANGED DWG FROM SHEET 3 OF 4 TO SHEET 4 OF 5 PLUS GENERAL REVISIONS	10 FEB 78	MPO
B		ADDED ITEM #42	20 MAR 78	MPO
C		CHANGED PER TWS REVIEW	23 MAR 78	MPO



TOWER BASE GND SYSTEM, POWER AND SIGNAL CABINET LOCATION

ITEM	DESCRIPTION	NSN	UI	QTY
LIST OF MATERIALS				
STD-AF-0190 SHEET 4 OF 5		USACEEIA-CED FORT MONMOUTH, NEW JERSEY		
DESIGN BY	M. WHARTON	AN/TSQ-117 ATC TOWER INSTALLATION DETAILS		
DRAWN BY	S. WAGNER			
CHECKED BY	DR. [Signature]			
DATE	18 JUL			
CCC-CED-SWA	APPROVAL [Signature]	50470	D	
PROJECT NO.		SCALE 1/8" = 1'-0"		

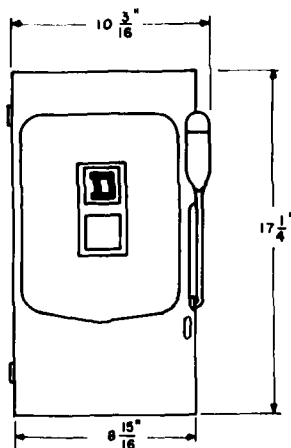
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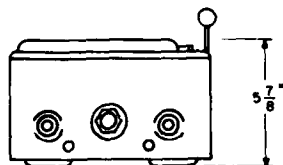
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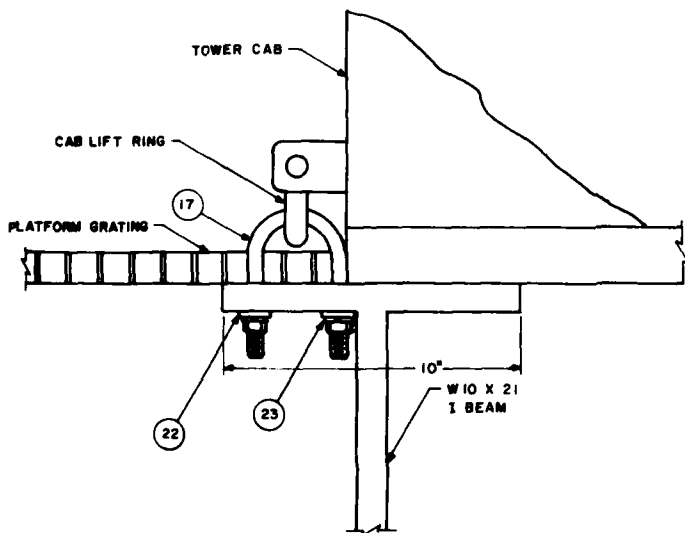


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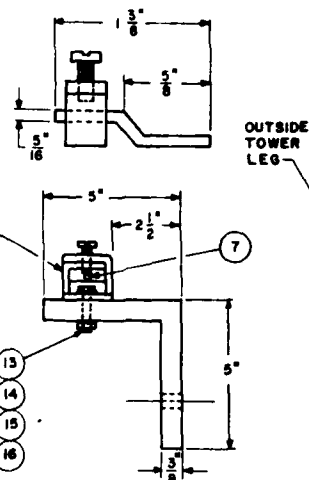
DETAIL C
SCALE: 1/4"
AC SAFETY SWITCH

B

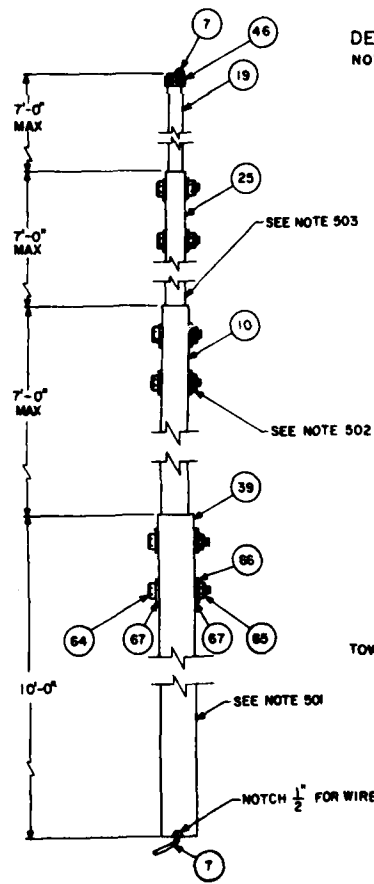


DETAIL D
TYPICAL CAB MOUNTING

A



DETAIL B
NOT TO SCALE



LIGHTNING PROTECTION MAST ASSEMBLY

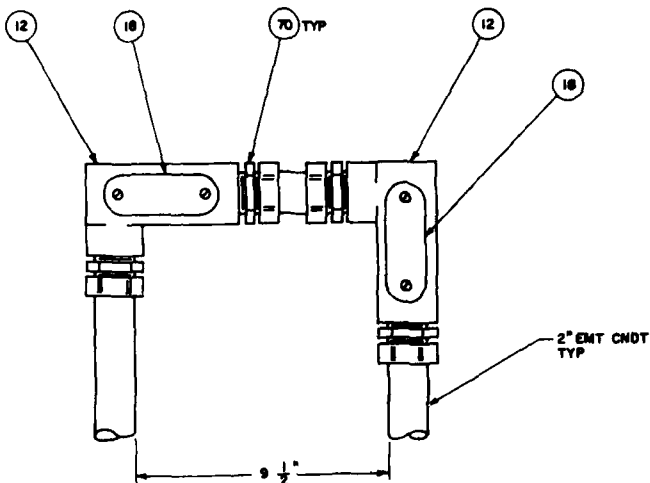
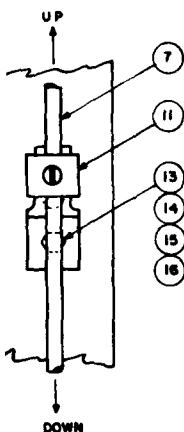
DETAIL F
NOT TO SCALE

CLAM

TOWER LEG

TO AC 100 AMP
SAFETY SWITCH
AT GROUND
ITEM 1

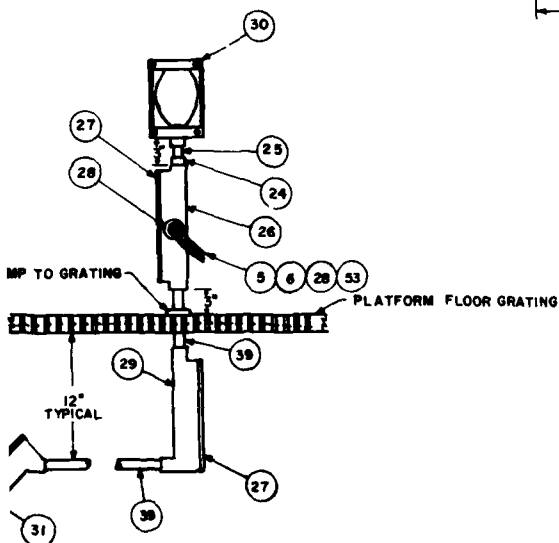
REVISIONS				
NO	DATE	DESCRIPTION	DATE	APPROVED
A		CHANGED DWG FROM SHEET 4 OF 4 TO SHEET 5 OF 5	10 FEB 78	<i>man</i>
C		CHANGED PER TWG REVIEW	13 MAR 78	<i>man</i>



DETAIL A
SCALE: NONE

NOTES:

- 501. BOTTOM OF ITEM NO. 39 RESTS ON TOP OF PLATFORM.
- 502. BOLT SPACING DEPENDS ON AMOUNT OF CONDUIT OVERLAP.
3 BOLTS MAY BE USED IF DESIRED.
- 503. FABRICATE USING ITEMS LISTED PLUS ITEMS 68 (CUT AND DRILL AS REQUIRED TO MATCH GUARD RAIL) 61, 62 AND 63.
FINISH WITH ITEMS 50 AND 69.
- 504. MOUNT ON GUARD RAIL IN SAME MANNER AS TACO ANTENNAS
IN ACCORDANCE WITH STD-AF-0207, SHEET-2 USING SAME
BOM ITEMS. FABRICAT MOUNTING PLATE USING ITEM 68.



DETAIL E
NOT TO SCALE

ITEM	DESCRIPTION	NSN	UI	QTY
LIST OF MATERIALS				
STD-AF-0190 SHEET 5 OF 5		USACEIA-CED FORT MONMOUTH, ARIZONA		
DESIGN BY M. WHARTON		AN/TSQ-117 ATC TOWER DETAILS		
CHECKED BY S. WAGNER				
DATE 22 JUL 77				
CCC-CED-SWA				
PROJECT NO.		50470		D
SCALE AS NOTED		SHEET 5 OF		

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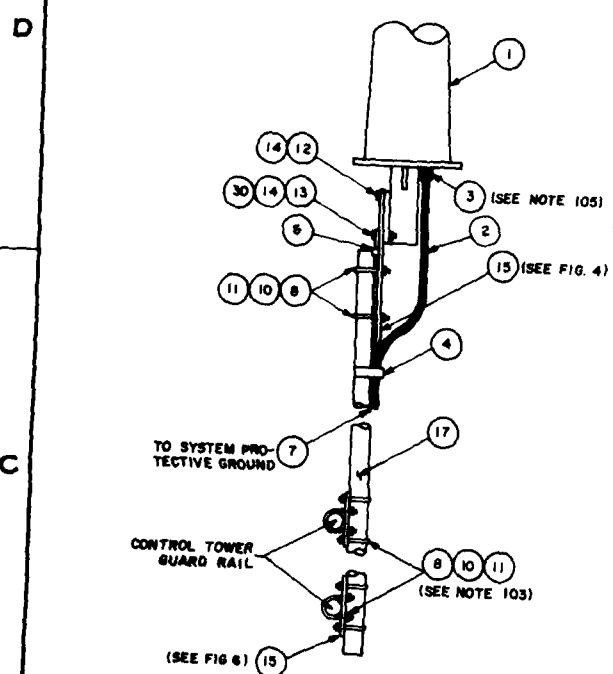


FIGURE 3
AS-1181/UR ANTENNA
RAIL MOUNT LAYOUT

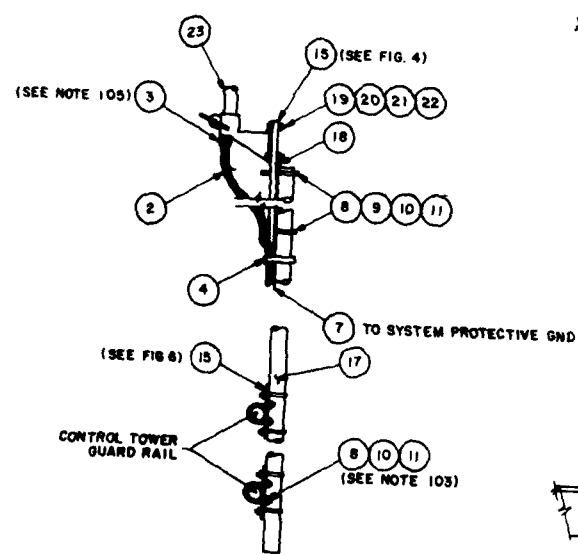


FIGURE 8
AT-197A/GR ANTENNA
RAIL MOUNT LAYOUT

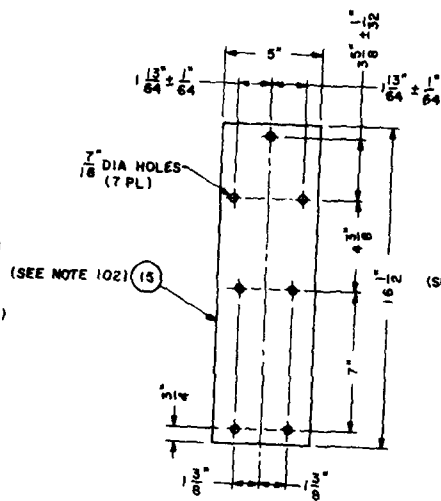


FIGURE 4
ANTENNA ADAPTER PLATE
(SEE NOTE 201)

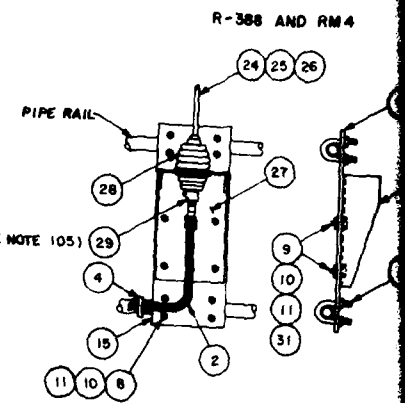


FIGURE 5
WHIP ANTENNA INSTALLATION

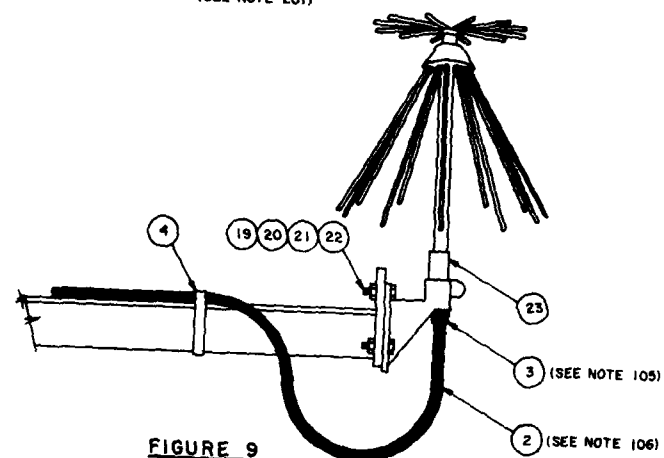


FIGURE 9
AT-197A/GR ANTENNA
MAST MOUNT LAYOUT

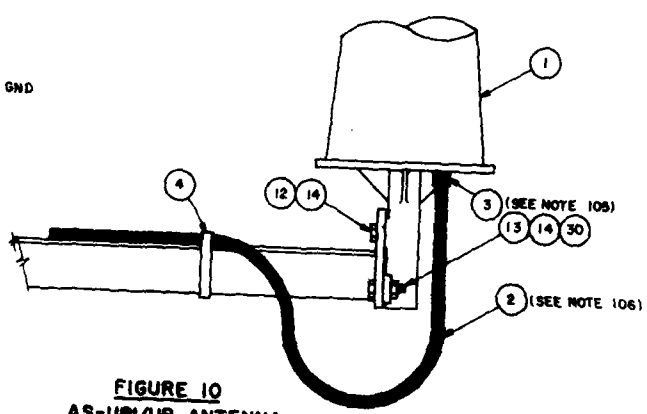


FIGURE 10
AS-1181/UR ANTENNA
MAST MOUNT LAYOUT

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REVISIONS			
REV	DATE	DESCRIPTION	APPROVED
A	21 OCT 76	REDRAWN FOR CLARITY	WHARTON
B	3 MAR 77	REVISED FIGURE 3, 7, 8, 11. ADDED NOTES 205-210 DWS NO. WAS COM-AF-207 2/2	WHARTON
J	24 FEB 1978	GENERAL REVISION TO SHEET 2 OF 2	WHARTON
K	22 MAR 1978	ADDED SHEET 3, THIS SHEET IS NOW, 1 OF 3	WHARTON
L	20 SEP 78	REVISED SHEET 3 & 2	WHARTON

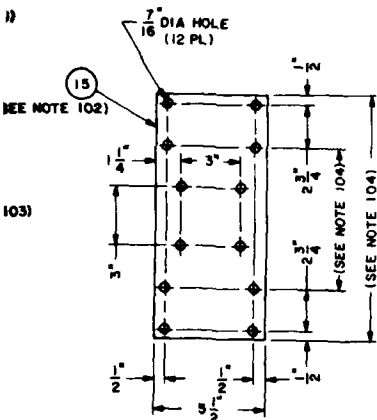


FIGURE 6
ANTENNA ADAPTER PLATE
(SEE NOTE 101)

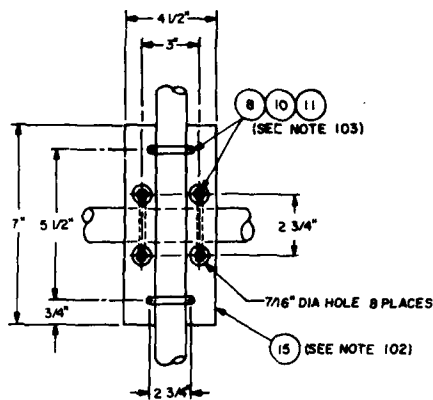


FIGURE 7

TABLE 1 (SEE NOTE 207)

ANTENNA ELEMENT REQUIREMENTS										
OPERATING FREQUENCY MHz	NUMBER OF ANTENNA SECTIONS REQUIRED	TYPE OF SECTIONS USED				NO. OF GROUND PLANE SECTIONS REQUIRED	TYPE OF GROUND PLANE SECTIONS			
		AB-21/GR	AB-22/GR	AB-23/GR	AB-24/GR		AB-21/GR	AB-22/GR	AB-23/GR	AB-24/GR
30 TO 36.5	4	1	1	1	1	15	2	1	1	1
36.5 TO 50.5	3	0	1	1	1	12	1	1	1	1
50.5 TO 75.95	2	0	1	0	1	9	0	1	1	1

NOTES:

101. ADAPTER PLATE TO BE LOCALLY FABRICATED.
102. FABRICATED FROM ITEM 15.
103. DIMENSIONS AND HARDWARE SHOWN ARE FOR 2" PIPE RAIL.
104. THESE DIMENSIONS DETERMINED BY DISTANCE BETWEEN PIPE RAILS.
105. WEATHERPROOF RF CABLE CONNECTION TO ANTENNA WITH ITEM 37 AND 38.
106. MINIMUM BENDING RADIUS FOR ITEM 2 IS 5".
107. IF VSWR IS TOO HIGH ON HIGHER END OF RANGE IT MAY REQUIRE REMOVING ONE SECTION OF THE GROUND PLANE ELEMENTS.
108. USE ITEM 39 AS SEALER.
109. PAINT ALL ANTENNA AND MAST MOUNTING HARDWARE WITH ITEM 40 AFTER INSTALLATION.
110. PAINT ITEM 15 WITH ITEM 40 PRIOR TO INSTALLATION.

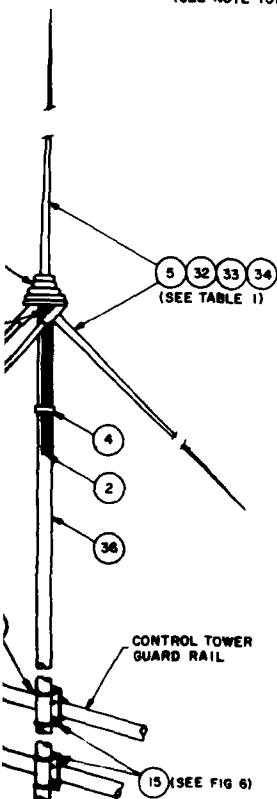


FIGURE 11
ANTENNA
MOUNT LAYOUT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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ITEM	DESCRIPTION	FSN	UI	QTY
LIST OF MATERIALS				
STD-AF-0207 SHEET 1 OF 3		USACEIA-CED FORT HARRIS, ALABAMA		
DESIGN BY	WHARTON	TYPICAL CONTROL TOWER ROOF ANTENNA MOUNTING LAYOUT AND DETAILS		
DRAWN BY	J. WREN			
CHECKER	G.R. RAY			
DATE	21 OCT 76			
ORGANIZATION APPROVAL		DATE SENT NO.	SIZE	
[Signature]		50470	D	
SHEET NUMBER		SHEET	OF	
REVISION STATUS OF SHEETS				

8

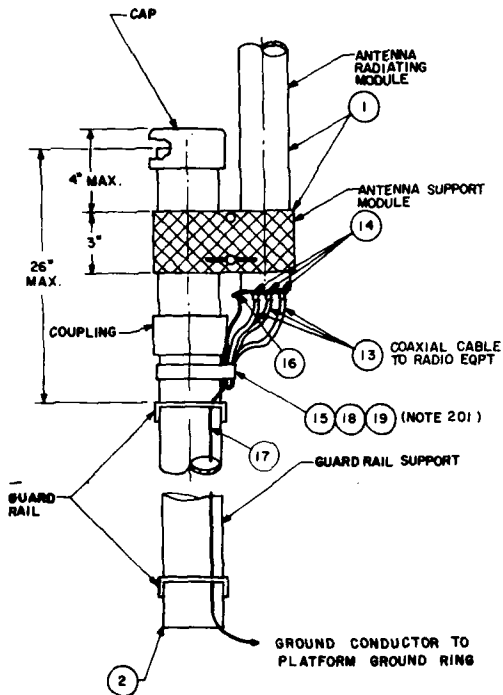
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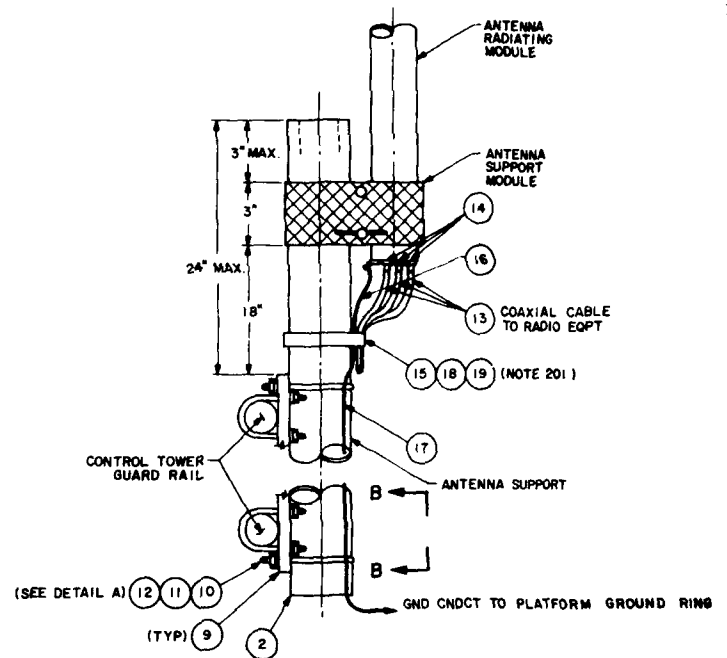


CONTROL TOWER
GUARD RAIL MOUNTING
C - CHANNEL RAIL

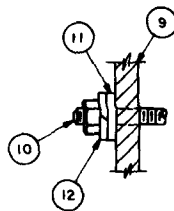
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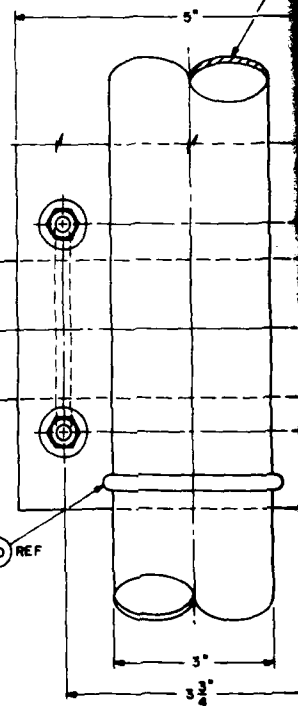
TOWER GUARD
RAIL MOUNTING
PIPE RAIL



DETAIL A
(TYP)

CONTROL TOWER
GUARD RAIL
MEMBER

(10) REF



VIEW B-B



REVISIONS			
REV	REASON	DATE	APPROVED
GEN	REVISED AND REDRAWN FOR CLARITY DWG NO. WAS COM-AF-200 3/4	3/8/77	2
B	GENERAL REVISIONS	2/23/76	7041
K	THIS SHEET NOW, 2 OF 3	22 MAR 1978	CHM
L	REVISED ANTENNA SUPPORT/GUARD RAIL MOUNTING	27 MAR 78	2

NOTES:

201. USE ITEM 18 OR 19 TO SECURE ALL COAXIAL CABLES TO MAST ASSEMBLY AND/OR GUARD RAILS AS REQUIRED. USE ITEM 15 TO PROTECT CABLE FROM PINCHING. DO NOT OVERTIGHTEN CLAMPS.
202. ALTERNATE ITEM IS $2\frac{1}{2}$ " EMT CONDUIT WHICH IS $2\frac{3}{8}$ " + 00

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REPRODUCE LEGIBLY.

19	CLAMP, HOSE, 6" TO 11"	4730-00-808-8236	EA	AR
18	CLAMP, HOSE, 3" TO 4"	4730-00-277-7132	EA	AR
17	WIRE, INSULATED, NO. 6 AWG	6145-00-578-8884	FT	AR
16	LUG, TERMINAL, COMPRESSION TYPE FOR NO. 6 AWG WIRE	6840-00-113-8184	EA	AR
15	TAPE, RUBBER COATED COTTON, 3/4" W	5870-00-844-3867	FT	AR
14	CONNECTOR, COAXIAL, N-SERIES, TYPE UG-21H/U (MALE)	9838-00-882-8883	EA	3
13	CABLE COAXIAL, TYPE RG-213/U	6145-00-880-8711	FT	AR
12	WASHER, LOCK, 1/2"	5310-00-740-4672	EA	8
11	WASHER, FLAT, 1/2"	5310-00-808-3079	PG	1
10	U-BOLT, STEEL, LONG TANGENT, BOLT SIZE 1/2"-13 X 7" LG WITH HEX NUTS, Mc MASTER-CARR	8875Y18	EA	4
9	PLATE, STEEL, 3/8" X 4" X 5"		EA	2
8	NUT, HEX, 3/8"-16	5310-00-881-0254	EA	3
7	DELETED			
6	WASHER, LOCK, 3/8"	5310-00-194-0081	EA	5
5	WASHER, FLAT, 3/8"	5310-00-888-2783	LB	1
4	U-BOLT, STEEL, FOR 3" O.D. PIPE, BOLT SIZE 3/8"-16 X 4 1/8" LG WITH HEX NUTS, Mc MASTER-CARR	3043T44	EA	2
3	DELETED			
2	PIPE, ALUMINUM ALLOY, 3" O.D. X 2.5 ID		EA	1
1	ANTENNA, MULTIPLE DIPOLE, TACO	D-2118 OR D-2218	EA	AR
ITEM	DESCRIPTION	PART NO./NSN	UI	QTY

LIST OF MATERIALS

STD-AF-0207
SHEET 2 OF 3

USACEIA-CED
FORT HANCOCK, ARIZONA

DESIGN BY N. WHARTON

DRAFTSMAN J. WREN

CHECKER *[Signature]*

DATE 6 MAR 77

ORGANIZATION *[Signature]*

MULTIPLE DIPOLE VHF/UHF ANTENNA
TYPE D-2118/D-2218
CONTROL TOWER MOUNTING DETAILS

50470

D

SCALE NONE

MADE IN USA

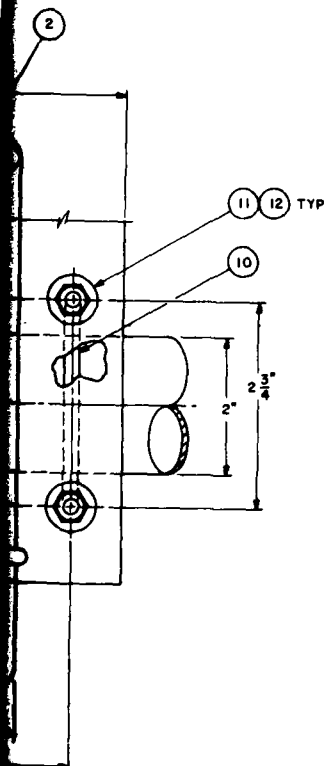
SHEET

OF

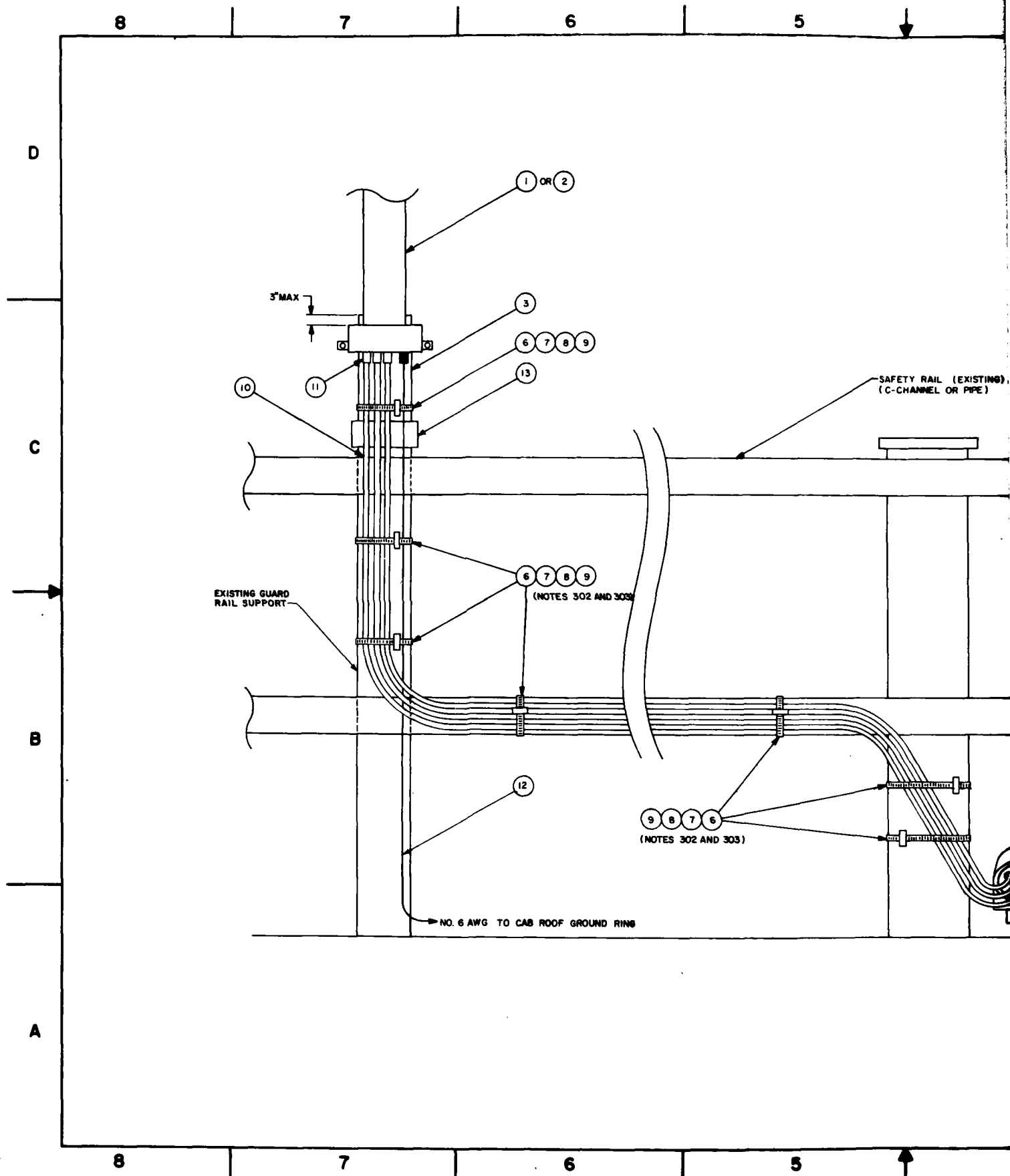
FORM 848 107

01 8 1 5

0694861



NOTE 202



REVISION				
ZONE	REV	DESCRIPTION	DATE	APPROVED
A	1	ADDED ITEM 13, REVISED BOM	26 FEB 79	

NOTES:

301. ANTENNA LOCATIONS-CENTER POST OF GUARD RAIL.
302. SECURE RF CABLES TO PIPES AND TO SAFETY RAIL USING HOSE CLAMP (ITEMS 6,7 AND 8).TO PAD CABLES FROM SHARP EDGES OF CLAMP WRAP EACH CLAMP WITH TWO LAYERS OF ELECTRICAL TAPE (ITEM 9). **DO NOT OVERTIGHTEN CLAMPS.**
303. SECURE RF CABLES TO LOWER SAFETY RAIL USING HOSE CLAMPS (ITEMS 6,7 AND 8) APPROXIMATELY 12 INCHES. **DO NOT OVERTIGHTEN CLAMPS.**
304. INSURE ALL CABLES HAVE DRIP LOOP TO PREVENT MOISTURE FROM RUNNING DOWN CABLES INTO SERVICE ENTRANCE CAP OR WX HEAD.
305. SEE USACEEIA DRAWING STD-AF-0640, FOR ANTENNA DETAILS.

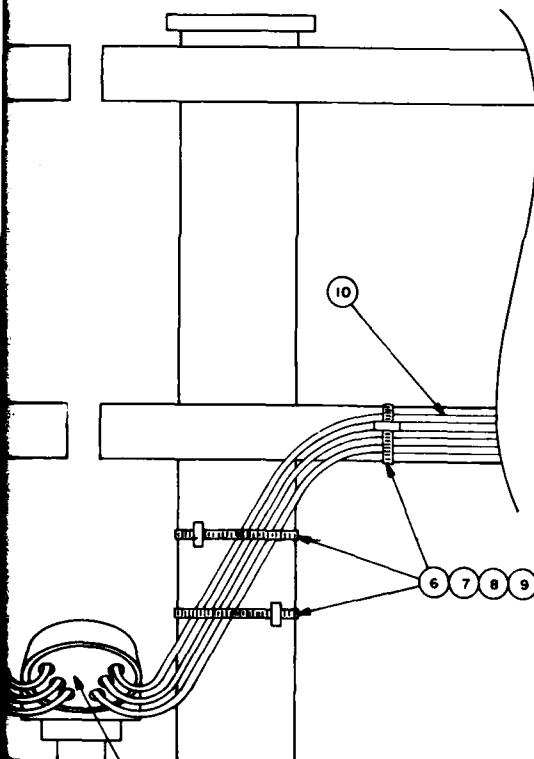
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SIGNIFICANT NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.

13		COUPLING, CONDUIT, 3" RIGID		EA	1
12		WIRE, NO 6 AWG, BARE, SOLID	6145-00-129-93	FT	
11		CONNECTOR, RF, UG- 1185A /U	9885-00-888-3127	EA	3
10		CABLE, RF, RG-21 3/U	8148-00-880-8711	FT	
9		TAPE, ELEC, PLASTIC, BLACK 3/4"	2870-00-448-4281	RL	1
8		CLAMP, HOSE, 6 3/4" TO 11"	4730-00-808-6288	EA	
7		CLAMP, HOSE, 3 1/16" TO 4"	4730-00-277-7132	EA	
6		CLAMP, HOSE, 1 13/16" TO 2 3/4"	4730-00-808-8827	EA	
5		WASHER, LOCK, SPENT, 5/8"	2870-00-252-0000	EA	4
4		U-BOLT, 5/8"-10 W/WRTH, F45"		EA	4
3		PIPE, 3/4" W/WRTH NO- 20-40944			
3		CONDUIT, 3" RIGID		FT	V2
2		ANTENNA, TACO MODEL D-2218		EA	1
1		ANTENNA, TACO MODEL D-2118		EA	1
ITEM	AEL	DESCRIPTION	NSN	UI	QTY
LIST OF MATERIALS					

LIST OF MATERIALS

TYPICAL ANTENNA RF CABLE INSTALLATION DETAILS-CAB ROOF

DESIGN NO STD-AF-0297	SIZE PSCH NO D 50470	DRAWING NO
DRAWN BY W. MILLER	SCALE	1" = 1'-0"
APPROVED BY W. MILLER	DATE	11/73



RF CABLE SERVICE ENTRANCE CAP
(WX HEAD) (EXISTING)

SECTION 5. BILL OF MATERIALS

5.1 GENERAL. This section identifies major items of equipment and materials necessary to install the AN/TSQ-117. The items identified are intended as a guide for preparing a BOM associated with a particular EIP. Items may be added or deleted as required to meet the requirements of a specific installation.

5.2 MAJOR ITEMS. The major items are listed on DA Form 3071-R (fig. 5-1). The authorized equipment list identification and national stock numbers are provided when available; however, when these numbers are not available, the nomenclature will include the manufacturer's part number.

5.3 RESPONSIBILITIES. The BOM items pertain to both the project coordination letter (PCL) and installation sites.

5.3.1 PCL items of responsibilities are 1 through 8, 26 through 31, 33 through 38, 42, 50, 51, and 55 through 57.

5.3.2 Installation sites items of responsibility are 2, 4, 5, 7, 9 through 25, 32, 33, 39, 40 through 50, 52, 53, 54, 58 through 67, and 69 through 71.

5.3.3 BOM item 58 will be furnished by Sacramento Army Depot at a later date. However, local fabrication is authorized providing materials are available.

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS									
Per use of this form, see AR 100-22, the proponent agency is the United States Army Communications Command.									
UNIT IDENT CODE									
LOCATION SEIP 027, AN/TSQ-117, AIRCRAFT CONTROL CENTRAL									
TELER NUMBER									
ITEM NO	STOCK NUMBER	NOMENCLATURE	DATE	UNIT	TOTAL REQ FOR PROJECT COMMAND	PAGE NO	NO OF PAGES	AVAILABLE	REQUIRED
1	NSNR (20694C)	SAFETY SWITCH, SQUARED #0223NRB		EA	1	1			
2	8030-00-281-2337 (08997J)	SEALING COMPOUND, PUTTY FORM		EA	1				
3	5316-00-218-1213 (206950)	LOCKNUT, BINDING, 1 1/2" FOR RIGID CONDUIT, 1 1/2" IN #RL-140		EA	2				
4	5975-00-284-5970 (02516H)	CONDUIT, 2" EMT		EA	AR				
5	5970-00-419-4291 (11723H)	TAPE, ELECTRICAL 3/4" WIDE 1000V INSUL		RO	AR				
6	NSNR	PLUG, CONNECTOR (SUPPLIED WITH CAB)		EA	AR				
7	6145-00-229-9832 (15243L)	WIRE, COPPER, BARE, 2 AWG		FT	AR				
8	NSNR (20697F)	CABINET, CABLE TERMINATING, 25 PR, PROTECTED RELIABLE W3-25 F&R		EA	1				
9	6145-00-577-8064 (03672K)	CABLE, TELEPHONE, 25 PR		FT	AR				
10	5975-00-178-1208 (02372M)	CONDUIT, GALV 1 1/2" RIGID TYPE		EA	AR				
11	5940-00-549-8075 (07452Y)	LUG, TERMINAL, BOLT STYLE		EA	20				

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Figure 5-1. Sample Bill of Materials (sheet 1 of 7).

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TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS				UNIT IDENT CODE	
Per use of this form, see DA Form 3871-2, 1 AUG 73, and the appropriate agency for the United States Army Communications Command.				DATE	PAGE NO. NO. OF PAGES
LOCATION SEIP 027, AN/ISO-112, AIRCRAFT CONTROL CENTRAL					
TYLER NUMBER					
ITEM NO.	STOCK NUMBER	NOMENCLATURE	UNIT	TOTAL REQ FOR PROJECT	AVAILABLE IN DEMAND
12	5975-00-644-3182 (02630A)	OUTLET, ELEC CONDUIT, 2", C-H/LB 67	EA	AR	
13	5306-00-042-6920 (07083K)	BOLT, SELF, 1/2"-20X1 1/2" LG	EA	20	
14	5310-00-761-6882 (07481X)	NUT, HEX, 1/2"X20	EA	20	
15	5310-00-809-3078 (10658N)	WASHER, ROUND, FLAT, 1/2"X.749" 00	EA	20	
16	5310-00-942-5109 (19635Z)	WASHER, LOCK, INT TOOTH, 1/2"	EA	20	
17	NSNR (20698G)	U-BOLT, 1/2" DIA X 5" LG, INSIDE WIDTH 2-15/16" (WITH 4 HEX NUTS) MCMASTER-CARR #8875T37	EA	AR	
18	5975-00-158-8485 (02845G)	COVER, CONDUIT OUTLET, 2" BLANK TYPE, C-H 670	EA	AR	
19	5975-00-178-1217 (02376Z)	CONDUIT, EMT GALV, 3/4"	LG	AR	
20	6145-00-660-6711 (07368K)	CABLE, COAXIAL, RG-213 OR EQUIV	FT	AR	
21	5935-00-241-1945 (21115F)	CONNECTOR, COAXIAL, UG-21C OR EQUIV TYPE N	EA	15	
22	5310-00-809-3079 (09141J)	WASHER, ROUND, FLAT, 1/2"	EA	AR	

DA FORM 3871-2, 1 AUG 73, IS OBSOLETE.

Figure 5-1. Sample Bill of Materials (sheet 2 of 7).

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS				UNIT IDENT CODE	
Per use of this form, see AR 105-22, the proponent agency is the United States Army Communications Command.				DATE	PAGE NO. 3
LOCATION SEIP 027, AN/TSO-117, AIRCRAFT CONTROL CENTRAL				UNIT	NO. OF PAGES
TELER NUMBER				TOTAL REQ FOR PROJECT	REQUIRED
ITEM NO	STOCK NUMBER	NOMENCLATURE	EA	AR	
23	5310-00-584-5272 (11065J)	WASHER, LOCK, SPLIT, 1/2"	EA	AR	
24	4730-00-007-6041 (08891Q)	RECEPTACLE, C-H #808-5, 1/2"-1"	EA	1	
25	5925-00-178-1018 (02377A)	CONDUIT, RIGID, SPLIT 1"	EA	1	
26	NSNR (20708G)	OUTLET BODY, C-H #81-5	EA	1	
27	NSNR (20699H)	COVER, BOLT, W/GASKET, C-H #86-68	EA	3	
28	NSNR (20700W)	CABLE FITTING C-H #CGB-5913	EA	1	
29	NSNR (20701Z)	OUTLET, BODY C-H #81B-5	EA	1	
30	NSNR (20702A)	RECEPTACLE, CIRCUIT BREAKER, C-H #ENR 31201	EA	1	
31	NSNR (20703B)	OUTLET BODY C-H #808-5	EA	1	
32	5306-00-894-3418 (14396L)	BOLT, U TYPE, STEEL 5/16" DIA FOR 1 1/2" RIGID CONDUIT	EA	AR	
33	6145-00-643-4641 (20696E)	CABLE, POWER, 4C2 STRANDED	FT	AR	

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Figure 5-1. Sample Bill of Materials (sheet 3 of 7).

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SEIP 027

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS									
Per use of this form, see AR 105-23, the proponent agency is the United States Army Communications Command									
UNIT IDENT CODE									
LOCATION SEIP 027, AN/ISO-117, AIRCRAFT CONTROL CENTRAL									
TELEPHONE NUMBER									
ITEM NO	STOCK NUMBER	NOMENCLATURE	DATE	UNIT	TOTAL REQ FOR PROJECT	PAGE NO. AVAILABLE IN COMMAND	NO OF PAGES REQUIRED		
34	3020-00-012-4979 (20704C)	UNIT, POWER, 7980, WECO #2269886		EA	1				
35	NSMR (207050)	SET, TELEPHONE, 500CM-3, WECO #2102986504		EA	NR				
36	5910-00-249-5165 (20706E)	UNIT, TELEPHONE, 4000, WECO #2202788		EA	8				
37	NSMR (17049J)	PANEL, TYPE 620-A, WECO #2269886		EA	1				
38	5233-01-056-1076 (20707F)	AIRCRAFT CONTROL CENTRAL, AN/TQ-117		EA	1				
39	5975-00-178-1209 (02373L)	CONDUIT, GALV, RIGID, 1 1/2", 10' LG		LG	1				
40	6145-00-542-6479 (06125F)	WIRE, COPPER, AWG 6, THW, INSUL WHITE		AR					
41	5370-00-184-2102 (02216E)	TAPE, RUBBER, ADHESIVE, 3/4" X 0.027"		RD	AR				
42	5940-00-239-9032 (15267J)	BOLT, SPLIT, FOR 2 AWG WIRE		EA	AR				
43	NSMR (20625A)	TIE WRAP, BLACK, OUTSIDE TYPE 7, HOLUB 13-442		PG	2				
44	NSMR (20630E)	TIE WRAP, BLACK, OUTSIDE TYPE 11, HOLUB 13-243		PG	2				

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Figure 5-1. Sample Bill of Materials (sheet 4 of 7).

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS			
For use of this form, see AR 105-22, the predecessor agency is the United States Army Communications Command.			
LOCATION SEIP 027, AN/TSO-117, AIRCRAFT CONTROL CENTRAL		UNIT IDENT CODE	
TELER NUMBER		DATE	PAGE NO. NO. OF PAGES
ITEM NO.	STOCK NUMBER	NOMENCLATURE	UNIT
45	NSMR (20631F)	ROD, STEEL, THREADED, 3/8"-16, 6' LG	EA 2
46	4730-00-423-0680 (07034V)	CLAMP, 8071, 3/4"-2 1/2"	EA AR
47	8030-00-874-5875 (11917E)	SEALANT, SILICONE RUBBER, 3.7oz TUBE	TUBE 4
48	NSMR (20397C)	ROD, GROUND, COPPERWELD, 5/8"x10'	EA AR
49	5975-00-X76-6921 (19771K)	CONDUIT, EMT, 2 1/2"x10' LG ANT MT	EA 2
50	8010-00-527-3192 (04094R)	PAINT, PRAY CAN, FAA ORANGE, 13oz CAN	CAN AR
51	NSMR (20644H)	TERMINAL, TELEPHONE, 25 PR, PROTECTED, RELIABLE ELEC #25FSR, 2X2 2/2 CLIPS	EA AR
52	5999-00-186-3912 (02301P)	CLAMP, COPPER, FOR 5/8" GND ROD	EA AR
53	NSMR (17266M)	CONDUIT, SEAL TYPE, FLEXIBLE, 1 1/2"	FT AR
54	5975-00-913-9184 (20638C)	CONNECTOR, SEAL TYPE, 1 1/2", GEDNEY 40125	EA 1
55	NSMR (16205B)	WIRE, 2 AWG, THW BLACK INSUL	FT AR

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Figure 5-1. Sample Bill of Materials (sheet 5 of 7).

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SEIP 027

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS									
Per use of this form, see AR 105-22; the procuring agency is the United States Army Communications Command									
LOCATION SEIP 027, AN/TSQ-117, AIRCRAFT CONTROL CENTRAL		UNIT IDENT CODE							
TELER NUMBER		DATE		PAGE NO.		NO. OF PAGES		TOTAL AVAILABLE FOR PROJECT COMMAND	
				6					
ITEM NO.	STOCK NUMBER	NOMENCLATURE		UNIT	TOTAL REQ FOR PROJECT COMMAND	AVAILABLE IN COMMAND	REQUIRED		
56	NSNR (16204A)	WIRE, 2 AWG, THW WHITE INSUL		FT	AR				
57	NSNR (23246C)	WIRE, 2 AWG, THW GREEN INSUL		FT	AR				
58	4730-00-908-6295 (20647A)	CLAMP, HOSE, 6"-11" DIA MS-35842-17		EA	AR				
59	4730-00-277-7132 (07373Q)	CLAMP, HOSE, 3"-4" DIA AE #5-5216660		EA	AR				
60	4730-00-132-9948 (15320L)	CLAMP, HOSE, 15/16"-4" DIA, IDEAL CORP #5656		EA	AR				
61	5310-00-732-0558 (10204G)	NUT, HEX, STEEL, 3/8"-16		EA	AR				
62	5310-00-637-9541 (00586C)	WASHER, LOCK, SPLIT RING, 3/8"		EA	AR				
63	5310-00-809-4061 (10233C)	WASHER, FLAT, ROUND, 3/8"		EA	AR				
64	5306-00-225-8508 (15245J)	BOLT, STEEL, 5/16-18X3 IN LG, HEX HEAD, STEEL		EA	AR				
65	5310-00-880-7744 (07679A)	NUT, HEX, STEEL, 5/16"-18		EA	AR				
66	5310-00-407-9566 (00569H)	WASHER, LOCK, SPLIT RING, 5/16"		EA	AR				

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Figure 5-1. Sample Bill of Materials (sheet 5 of 7).

TELECOMMUNICATIONS DEVELOPMENT PROJECT - BILL OF MATERIALS					
For use of this form, see AR 105-22, the proponent agency, is the United States Army Communications Command.					
LOCATION		UNIT IDENT CODE			
SEIP 027, AN/TCO-117, AIRCRAFT CONTROL CENTRAL					
TELECOM NUMBER					
ITEM NO	STOCK NUMBER	NOMENCLATURE	DATE	PAGE NO	NO. OF PAGES
			UNIT	TOTAL REQUIRED PROJECT	AVAILABLE PROJECT COMMAND
67	5310-00-639-1526 (091139K)	WASHER, FLAT ROUND, 5/16"	EA	AR	
68	NSNR (206435)	STEEL, SHEET, 4"x5"x0.187" SAAD FAB (DRILL AS REQUIRED FOR RAILMTG)	PC	AR	
69	8010-00-616-9182 (206400)	PAINT, PRIMER COATING, ZINC CHROMATE 16oz SPRAY CAN	CAN	AR	
70	5975-00-661-1007 (02647G)	BOX CONNECTOR, ELEC, 2" THINWALL COMP TYPE APPLETON 96T200	EA	AR	
71	NSNR (16403H)	WRAPLOCK, 100'x1/2" PRODELIN 20-150	KT	1	

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Figure 5-1. Sample Bill of Materials (sheet 7 of 7).

SECTION 6. QUALITY ASSURANCE PROCEDURE

6.1 GENERAL. The QA program for the AN/TSQ-117, aircraft control central, defined in the preceding sections has been developed in accordance with the provisions and criteria of chapter 5, CCR 702-1-2. The QA program is to be implemented in accordance with this and the following two sections and will provide the assurance to all concerned that the specified equipment and facilities have been installed in accordance with the requirements and criteria of this SEIP as supplemented through individual EIP's and are acceptable for turn-over to and use by the operating agency. The requirements and criteria specified here and in sections 7 and 8 constitute the QA plan for the specified AN/TSQ-117. Individual EIP's will be used to supplement, expand, modify, or otherwise adapt the requirements and criteria to unique situations and circumstances applicable to each site location.

6.2 QUALITY ASSURANCE PROGRAM.

6.2.1 The QA program defined herein consists of a planned and systematic approach for assessing the quality during the installation and acceptance testing of project implementation and correcting at the earliest time any discrepancies, deficiencies, or shortcomings revealed through inspection and test efforts. The QA and quality control (QC) planning and functions will begin at the earliest stages of project implementation and end only after all possible corrective action efforts are completed and the AN/TSQ-117 is released to the operating or user agency. The QA and QC functions are to be performed by personnel operating independently from those charged with the engineering of the installation or involved in the process of installing the AN/TSQ-117. Under the program, these functions are divided among three participating organizations: (1) the test agency, (2) the installation agency, and (3) the operating agency.

6.2.2 Test agency. As the manager and implementer of the QA program and acceptance testing efforts for the AN/TSQ-117, the test agency will commence project planning as soon as tasked. The test agency QA representative/test director is responsible for periodic in-process QA checks, final QA inspections, and acceptance tests in accordance with management provisions of CCCR 702-3 and this SEIP. Quality assurance inspections will be performed at the discretion of this Agency for the purpose of assessing the effectiveness of the QC effort by the installation agency; initiating corrective actions thereto, as appropriate; and determining the extent to which the installation effort adheres to the requisite quality requirements. Acceptance testing is conducted in accordance with section 7 and for the purpose of determining if the installed AN/TSQ-117 complies with the technical requirements of this SEIP as amended by individual

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EIP's and that the AN/TSQ-117 is suitable for the intended application. At the earliest stages of project initiation, the test agency is to identify a QA representative/test director. For project continuity and effective management, a single individual should be assigned both roles. This will assure that the QA and test efforts are fully integrated and the following actions are expeditiously accomplished in the following manner and sequence:

- a. Implement the QA concepts and requirements identified herein. Participate in the development of individual EIP's incorporating site particular requirements therein.
- b. Assure that the participating elements and organizations are thoroughly familiar with their respective roles in support of QA, QC, and testing, and have been properly tasked.
- c. Validate through the use of project oriented reports, formal and informal contacts, project status reviews, onsite inspections such as the QC and installation efforts to assure compliance with the stated requirements and criteria of this SEIP. When an inadequacy is found to exist in the installation agency QC effort, the procedures of CCCR 702-7 will be applied. Follow-up actions will be monitored and those discrepancies or differences which cannot be resolved in a timely manner will be brought to the attention of higher authority.
- d. Facilitate responsibilities by identifying and recording this information and data as required by HQ CEEIA CCC-TED-QA Form 113-R (fig. 6-1). This form becomes a part of the project files and will be updated as necessary to assure orderly project execution. The dissemination of this information with the participants in the QA program is encouraged.
- e. Perform a final QA inspection, using HQ CEEIA CCC-TED-QA Form 111-R (fig. 6-2), tailored to the specifics of this effort. When the installation effort and checkout of the AN/TSQ-117 is completed, this SEIP, the individual EIP, and T.O. 31-10 Series shall be the evaluation criteria for the site inspection efforts. This inspection will consist of thorough visual and mechanical observations of the installed material, QC records, onsite inspection, and other factors to evaluate the quality of the work performed and its acceptability.
- f. Conduct acceptance tests in accordance with the provisions of section 7, the subsidiary documents specified therein, and CCCR 702-3 to determine the acceptability of the AN/TSQ-117, as installed. If the results of any portion of acceptance tests are not satisfactory, corrective action efforts are to be initiated through onsite engineering, installation, and operational participants and in the absence of such representation, through channels. The QA

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	<u>Individual POC</u>	<u>Bldg. No.</u>	<u>Rm. No.</u>	<u>Phone No.</u>	<u>Name of Agency</u>
COGNIZANT AGENCY, COMMAND, AND FACILITY QA POINTS OF CONTACT (CCCR 702-2)					
<u>Installation:</u>					
Team Leader					
Assistant Team Leader					
Quality Control					
<u>Quality Assurance Agency:</u>					
Representative					
Testing Activity					
<u>Operating Agency:</u>					
Representative					
Site Commander					

HQ CEEIA CCC-TEU-QA FM 113-R
1 JAN 79

Figure G-1. Sample form of cognizant agency, command, and facility points of contact.

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QUALITY ASSURANCE/MIL-Q-9858A/ MIL-I-45208 PROGRAM CHECKLIST (CCCR 702-2)			DATE (Day, Month, Year)			
SITE/LOCATION		PROJECT NAME		QUALITY ASSURANCE REPRESENTATIVE (QAR)		
___ QA	___ MIL-Q-9858A	___ MIL-I-45208	TASK NO.			
1. Is the on-site inspection/quality program available for review? 2. Does the inspection system/quality program address the pertinent requirements which will assure that all conditions are complied with? 3. Are quality personnel and their responsibilities identified? 4. Are detailed work instructions provided and complied with? 5. Do records provide useful information, data, and indicate follow-up action? 6. Are provisions made for prompt corrective actions when deficiencies occur? 7. Are procedures provided and complied with for prevention and correction of defects? 8. Are pertinent documents and drawings available? 9. Are procedures provided and complied with for updating and controlling documents and drawings? 10. Are procedures provided and complied with for storage of material prior to installation. 11. Are in-process and final test and inspection procedures available and used? 12. Is inspection system being complied with in all phases?				YES	NO	NA

HQ CEEIA CCC-TED-QA FM 111-R
(Rev 1 Jan 79) Previous edition 6 DEC 78 is obsolete.

Figure 6-2. Sample form of quality assurance program checklist (sheet 1 of 2).

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QUALITY ASSURANCE/MIL-O-9858A/MIL-T-45213 PROGRAM CHECKLIST (CCCR 702-2)			
	YES	NO	REMARKS
13. Are procedures provided for control of subcontractor's work?			
14. Are procedures provided for calibration and controlling of test equipment?			
15. Are procedures provided for handling, inspection, and test of furnished material?			
NOTE: IF THE "NO" COLUMN IS CHECKED, EXPLAIN HERE, AND CONTINUE ON REVERSE SIDE IF NEEDED.			

Figure 6-2. Sample form of quality assurance program checklist (sheet 2 of 2).

representative/test director may retest to verify that corrective action efforts have been implemented and that the efforts will preclude recurrence. After satisfactory resolution, he may subsequently resume acceptance tests. If these items cannot be resolved by onsite personnel, the QA representative/test director will take either of the following actions: (1) Reject the AN/TSQ-117 and terminate testing until the matter is corrected or resolved or (2) attempt to complete the acceptance tests noting the discrepancies, deficiencies, or shortcomings as exceptions on the technical acceptance recommendation (TAR), Form 98-R (fig. 8-1). The participating agencies and organizations will be notified of these discrepancies, deficiencies, and shortcomings at the earliest practical date.

g. Record and analyze test results, determine acceptability of the installed AN/TSQ-117, record the data and findings on the TAR, and coordinate the data with the designated participants. prepare a final test report, and make distribution in accordance with the guidance, direction and format of CCCR 702-2. Project tasking documents must be consulted for modification of the distribution requirements. The acceptance test report will note outstanding installation and operational exceptions, and will recommend corrective actions to be taken by the responsible and participating agencies. The report will document project completion with correction of the exceptions being documented by correspondence or supplemental test reports as determined by the QA representative/test director or test agency, as appropriate.

6.2.3 Installation agency. In accordance with the provisions and authority of CCCR 702-4, the installation agency will establish and maintain a QC system. The QC system will assure that assessments of quality are conducted in accordance with the published procedures and that the results of the agency's QC inspections and follow-up actions are adequately recorded. HQ CEEIA CCC-TED-QA Form 112-R (fig. 6-3) may be used for this purpose. The records are to be made available for review and evaluation by the test agency's QA representative/test director. The shakedown checkouts are to be satisfactorily completed and necessary corrections made before offering the AN/TSQ-117 for acceptance testing. The installation activity's QC system must meet all procedures contained in USACEI Bn Pamphlet 105-3. The installation agency will designate a QC representative who will assure that all the following actions are expeditiously performed:

a. Assure that the QC procedures are effectively applied on this installation and establish the reporting requirements consistent with this project, the EIP, and all policies. Assure that the corrective action efforts related to the installation are resolved and corrected at the earliest possible point in the installation effort.

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)		DATE (Day, Month, Year)		
SITE		LOCATION		
PROJECT NAME		TASK NO.		
REFERENCES FOLLOW MAIN AND SUB PARAGRAPHS				
		YES	NO	NA
A. <u>Drawings and Specifications</u> (AFTO 31-10-3, -9, -27, -29, USACEEIA PAM 105-10):				
1. Is the EIP complete and available?				
2. Are floor plans available?				
3. Are equipment location drawings available?				
4. Are face layout drawings of equipment in bays available?				
5. Are drawings for the MDF/CDF/IDF/CCFB block assignments available?				
6. Is stenciling of terminal blocks shown on drawings?				
7. Are pin connections on terminal blocks shown on drawings?				
8. Are drawings of AC/DC power distribution equipment available?				
9. Are wire sizes and circuit breaker capacity shown on drawings?				
10. Are schematic diagrams of typical circuits to be installed included in drawings?				
11. Are drawings of site grounding systems available?				
12. Do specifications contain a list of reference material required by installers?				
13. Are drawings showing the arrangement of cable racks, ducts, and trenches available?				

HQ CEEIA CCC-TED-QA FM 112 R
Rev (6 JAN 79) Previous edition 1 JAN 79 is obsolete.

Figure 6-3. Sample form of quality checklist-installation
(sheet 1 of 13).

QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
14. Do specifications contain the cable running list for power distribution?			
15. Do specifications contain the cable running list for signal cabling?			
16. Do specifications contain the cable running list for RF cabling?			
17. Do specifications contain the cable running list for optical cabling?			
18. Do specifications contain detailed information on grounding/bonding/shielding?			
19. Do specifications contain details on all special instructions for installers?			
20. Do the drawings reference all applicable items to the BOM?			
B. Tools and Equipment (AFTO 31-10-29):			
1. Is equipment damaged or unserviceable?			
2. Are all installation materials on hand and serviceable?			
3. Are all special tools necessary for completion of the job on hand?			
4. Will all test equipment needed for test and checkout be available?			
5. Is the BOM equipment available at the facility?			
6. Is the C-E equipment BOM available at the facility?			
7. Has the C-E equipment been inventoried and are discrepancies reported (2-13)?			
C. General Safety Practice (AFTO 31-10-all):			
1. Are goggles worn when drilling and grinding?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 2 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
2. Are all sharp edges properly disposed of?			
3. Are hand tools properly used?			
4. Are electric tools properly grounded?			
5. Are rubber gloves used when working near electrical hazards?			
6. Is first-aid equipment on site?			
7. Are emergency numbers posted conspicuously?			
8. Are safety practices observed during the installation?			
D. Floor Plan Layout (AFTO 31-10-9):			
1. Are equipment layout plans in accordance with drawings?			
2. Was the layout plan completed before equipment was moved into area?			
3. Are reference lines still visible/useable (2-11)?			
E. Erecting and Mounting (AFTO 31-10-29):			
1. Is equipment laid out in accordance with floor plan drawing (2-10)?			
2. Are equipment bays level and plumbed within tolerances (2-42)?			
3. Has proper spacing been provided between equipment racks (2-36)?			
4. Are base angles of frames secured to floor in the proper location (2-48)?			
5. Are all cabinets flush mounted and plumbed (2-36)?			
6. Has the finish of equipment/cabinets/racks been touched up (3-2a)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 3 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
7. Are bolts and screws free from stripped threads and defaced heads (3-3f)?			
8. Are sufficient clearances provided between apparatus for heat dissipation (3-11)?			
9. Are terminal blocks aligned on MDF/CDF/IDF (3-23)?			
10. Has equipment been installed in cabinets or racks in accordance with face layouts?			
11. Are all nuts and bolts securely tightened (3-3h)?			
12. Are exposed or cut ends of metal filed smooth and painted?			
13. Are the correct lock and flat washers used (3-3a, e, and f)?			
F. <u>Cable Racks</u> (AFTO 31-10-6):			
1. Location of cable racks:			
a. Are racks located in accordance with the cable plan drawing (3-17)?			
b. Does the height of racks conform to the drawing (3-13)?			
c. Are racks located so that clearances for installation and maintenance of equipment are unencumbered (3-14)?			
d. Are racks located so cables are not subject to damage, exposure, or other detrimental conditions (3-36a)?			
2. Assembly of cable racks:			
a. Are long sections of racks used where possible (3-3b)?			
b. Have clamping details been altered other than where necessary to avoid interference?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 4 of 13).

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SEIP 027

QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
c. Are open ends of racks properly closed (3-34)?			
d. Are vertical racks properly terminated on floors (3-36h)?			
3. Support of cable racks:			
a. Are racks properly supported and fastened (3-36b)?			
b. Are racks installed so that no excessive load or binding is imposed on the equipment (3-36e)?			
c. Are horizontal racks supported on 5' centers but not exceeding 6' (1-16)?			
d. Has support been provided within 3' of free end of rack (1-16)?			
e. Are racks braced to prevent sway (2-50)?			
f. Are racks level (3-33)?			
G. <u>Running Cable</u> (AFTO 31-10-13):			
1. Are cable runs made in accordance with cable running list (1-34)?			
2. Are cables twisted or crossed on cable rack (1-43)?			
3. Do cables at turns or bends conform to the bending radius and maintain their position (1-42)?			
4. Is protection provided where cable sheaths contact rough or sharp edges or metal (1-53)?			
5. Are cables, which are turned off over the side of cable racks, formed with the minimum allowable radius (1-42)?			
6. Are cables turned off rack horizontally and then up/down (1-42)?			
7. Do cables to the MDF/CDF/IDF enter on the vertical side (3-56)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 5 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
8. Are cables serving the horizontal side of a frame secured to the transverse arms near the vertical upright (3-58)?			
9. Are cable tags properly prepared and in accordance with the cable running list (1-26)?			
10. Are cable tags secured at each end of the cable run (2-3)?			
11. Have cable tags been removed upon completion of verification and termination excluding coaxial cables (1-32)?			
12. Are cable butts located as near as practicable to the point where the first conductors turn out (4-8)?			
13. Are cable butts properly treated (4-9)?			
14. Is the cable pile-up exceeded (1-18)?			
15. Are the conductors damaged at the cable butt (4-9)?			
16. Are the AC/DC power cables separated for signal cables (1-49)?			
17. Are the correct color conductors used for power runs(AFTO 31-10-2, 3-100)?			
H. Securing Cable (AFTO 31-10-2, -13)?			
1. Is the starting stitch properly made and placed (3-22)?			
2. Is the required Kansas City City Stitch properly made (3-26)?			
3. Are first and succeeding layers properly secured (3-28)?			
4. Are cables secured at every other cable rack cross strap on horizontal runs (3-21)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 6 of 13).

QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
5. Are cables secured at every cable rack cross strap on vertical runs (3-53)?			
6. When cable butt is between securing devices, are cables secured together with the appropriate stitch (3-54)?			
7. Are lock stitches properly made and spaced (3-32)?			
8. Are splices in twine properly made (3-32)?			
9. Are cables protected where twine is apt to cut or damage cable (3-3)?			
10. Is the correct amount of cable secured under one stitch (3-16)?			
I. Sewed Forms (AFTO 31-10-2):			
1. Is proper size twine used for the diameter of the form (3-25)?			
2. Are the proper stitches used and spaced (3-26, 3-30)?			
3. Are wires formed correctly (3-49)?			
4. Are the skimmers the correct length (2-26)?			
5. When ty-wraps are used, are the correct size and spacing maintained (3-42)?			
6. Are spare wires treated correctly for the form (3-51)?			
J. Butting and Stripping (AFTO 31-10-13):			
1. Are the proper tools used (4-9, 4-15, 4-24)?			
2. Are the cable butts properly dressed (4-32, 4-34)?			
3. Is the proper distance maintained from the cable to the fanning strip (4-8)?			
4. Is the cable butt adequately supported (3-54)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 7 of 13).

QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
5. Are the conductors damaged at the cable butt (4-9)?			
K. Fanned and Formed Conductors (AFTO 31-10-2):			
1. Are cables fanned and connected to the correct side of the terminal blocks (2-7)?			
2. Are the conductors in the fanned form twisted and bunched (2-14)?			
3. Are fanned forms straight and taut from the cable butt to the fanning strip (2-23)?			
4. Is the length of the skimmers correct (2-26)?			
5. Has the correct color code been followed (2-28)?			
6. Are spare/unused/unequipped conductors disposed of properly (2-31)?			
7. Are the shields properly disposed of (3-79)?			
L. Stenciling (AFTO 31-10-27):			
1. Is equipment correctly identified and stenciled in accordance with floor plan drawings (1-24)?			
2. Are designations located correctly (2-16)?			
3. Are correct size designations used on particular types of apparatus or equipment (2-16)?			
4. Are the correct abbreviations used (3-3, 3-5)?			
M. Strapping (AFTO 31-10-16):			
1. Are the straps properly placed (1-15)?			
2. Is the correct type of strap wire used (1-17)?			
3. Does the insulation extend to the terminal (2-9)?			
4. Do the straps interfere with the operation of the equipment?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 8 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
5. Do the straps make maximum contact with the terminals (2-6)?			
6. Do wrapped straps conform to the criteria of wrapped conductors (AFTO 31-10-1, 2-111)?			
7. Do straps obscure equipment designations (2-52f)?			
N. Terminating and Soldering Conductors (AFTO 31-10-7):			
1. Are the soldering clamp and solder bag used when connecting conductors (2-45a)?			
2. Is the proper soldering iron used (2-5)?			
3. Is all soldering done with the correct rosin core solder (2-22)?			
4. Is the conductor connected to the terminal correctly (2-34, 2-38)?			
5. Do skimmers on terminals, both wrapped and soldered, exceed 1/16" (2-34)?			
6. Is the insulation burnt, frayed, or otherwise damaged (2-34)?			
7. Have all unsightly flux and excess globules of solder been removed?			
8. Are the conductors given a continuity test after termination?			
9. Are wrapped connections applied only to suitable terminals (2-113)?			
10. Are mechanical connections making good contact, secure, and under no local stress (2-81)?			
11. Do pressure connections provide a good electrical connection (2-86)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 9 of 13).

QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
12. Are the required number of turns in contact with the terminal in accordance with the gauge of wire used (2-120)?			
13. Are the conductors dressed on the terminal block after termination?			
14. Are wrapped connectors soldered where necessary (2-131f)?			
15. Do the wrap connections appear uniform with no open spirals, overwraps, or shiners exceeding 1/16" (2-131)?			
O. Cross Connections (AFTO 31-10-11):			
1. Are jumpers routed at the MDF/CDF/IDF correctly (2-6)?			
2. Is there sufficient slack remaining after termination (2-32)?			
3. Are conductors twisted between fanning strip and terminal (2-34)?			
4. Does the pair twist remain in conductors beyond the rear of the fanning strip (2-34)?			
5. Are jumpers properly dressed (2-54)?			
6. Are jumpers made in accordance with the cable running list?			
7. Is the correct gauge wire used?			
8. CCP's (USACEEIA PAM 105-10):			
a. Are sufficient jacks/plugs available for use with the CCP's (3-1)?			
b. Are jumpers made with 26 AWG wire only (3-1a)?			
c. Are modular tools available (3-2)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 10 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
P. Equipment and Signal Grounds (AFTO 31-10-24, MIL-STD-188-24, TM 11-487-4):			
1. Are equipment and signal grounds installed in accordance with applicable drawings?			
2. Are the correct color coded cables used?			
3. Are grounds/bonds/shields protected from external corrosion?			
4. Are the correct screw/washer/nut combinations used on ground junctions?			
5. Are equipment/signal/protective grounds connected at the station ground box only?			
6. Are the signal grounds and signal buss insulated?			
Q. Conduit (AFTO 31-10-12):			
1. Are burrs removed from conduit after cutting (2-40)?			
2. Is the bending radius exceeded (2-55)?			
3. Are there more than 360 degrees of total bends in a single conduit run(2-46)?			
4. Does the number of conductors in a conduit exceed the established criteria (2-16)?			
5. Are conduits supported at intervals not exceeding 6' and within 3' of the end or outlet box (2-58)?			
6. Are flexible conduits terminated correctly (2-98)?			
7. Are all connections tight and secure?			
8. Are secure conduit runs correctly marked?			
R. Metal Ducts (AFTO 31-10-12):			
1. Are the ducting/raceways supported and anchored adequately (2-97, 3-10)?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 11 of 13).

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QUALITY CHECKLIST INSTALLATION (CCCR 702-2)			
	YES	NO	NA
2. Is the percent of fill or voltage rating of the duct exceeding (3-5, 3-50)?			
3. Are junction boxes of underfloor raceway level and secure (3-26)?			
4. Are all covers secured in place?			
5. Have all entrance/exit holes for outside ducting been properly sealed (2-23)?			
6. Is the red/black criteria observed?			
S. Coaxial Cables (AFTO 31-10-14):			
1. Is cable inspected for damage prior to termination?			
2. Where required, is cable sewn in the same manner as signal cable?			
3. Are the correct connectors on cable ends (2-6)?			
4. Are connections secure, free of excess solder, and electrically open (1-42, 1-55)?			
5. Are cable tags still connected to both ends of the RF cable (3-29)?			
6. Is the bending radius exceeded (1-73)?			
7. Are the cables properly supported (1-26, 3-21)?			
8. Are rigid cables properly grounded (1-46, 3-27)?			
9. Is the pressure maintained (1-75, 3-61)?			
T. Optical Fiber Cables (OFC):			
1. Are the OFC protected so that external conditions will not crush the fibers?			
2. Has adequate slack been provided for maintenance loops?			

Figure 6-3. Sample form of quality checklist-installation
(sheet 12 of 13).

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QUALITY CHECKLIST - INSTALLATION (CCCR 702-2)			
	YES	NO	NA
3. Are the external strength members of the OFC properly served?			
4. Are the fibers properly terminated?			
U. <u>Waveguides and Antennas</u> (USACEEIA PAM 105-3):			
1. Are waveguides stored horizontally and away from heavy objects (7a)?			
2. Are waveguides inspected for damage and cleaned prior to installation (7a)?			
3. Are waveguides supported correctly (7a)?			
4. Are the feed horns aligned correctly?			
5. Do waveguide bends conform to the minimum radius (8b, 8e)?			
6. Are antennas/reflectors mounted at the prescribed heights?			
7. Are antennas/reflectors oriented to the correct azimuth?			
8. Are E and H plane benders on hand for elliptical waveguides?			
9. Are waveguides grounded correctly (7-6 (7))?			
<hr/> QUALITY REPRESENTATIVE			

Figure 6-3. Sample form of quality checklist-installation
(sheet 13 of 13).

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b. Assure that the availability of test equipment for shakedown in conjunction with participating elements and checkout and acceptance testing. Reliance is to be placed upon the operating agency to supply test equipment when it is common to operations and maintenance functions.

c. Assure that the shakedown is accomplished as specified and any corrective action is completed prior to acceptance testing.

d. Advise the QA representative/test director of the anticipated completion date at the earliest time. This notice should be given not less than 10 days prior to the scheduled completion to permit efficient and expeditious transportation of test personnel and equipment.

e. Assure that an adequate complement of personnel remain onsite to assist in the final QA inspection and acceptance test.

f. Assure that the QC inspection records and installation documentation are maintained onsite and readily available to the QA representative/test director. When the onsite effort is completed, the QC documentation shall be placed in the project files and maintained for 1 year.

6.2.4 Operating agency. The operating agency will be the site or location cognizant element and will be so identified in all project documentation and individual EIP's. Tasking to support the USACEEIA QA and acceptance test effort will be accomplished through command channels. The operating agency will designate a representative early in the project but no later than the start of installation. He will assure that the following actions are taken and expeditiously completed:

a. Provide administrative and typing support.

b. Serve as interface between the installation, quality assurance, and test personnel and the operating agency.

c. Assist in resolution of discrepancies, deficiencies, and shortcomings.

d. Make operating and maintenance personnel available to assist on an as-required basis.

e. Provide a representative to witness the acceptance test and sign the TAR.

5.3 SPECIAL CONSIDERATIONS.

5.3.1 Interruptions. Quality assurance inspections and tests may be interrupted at any point if there is an equipment or system malfunction. They may also be interrupted at a compatible breaking point to permit scheduled duty breaks. Any inspection that is interrupted because of equipment malfunction shall be restarted at a point determined appropriate by the QA representative/test director.

5.3.2 Substitutions. Spare equipment may be substituted for malfunctioning equipment with the approval of the QA representative/test director. Any equipment which has been replaced shall be repaired and retested. During acceptance tests, any piece of equipment, including cables, conduit, etc., may not be changed or adjusted without the approval of the QA representative/test director.

5.3.3 Corrections or modifications of documentation. Site plans, specifications, EIP's, drawings, etc., are to be acquired by QA, QC, and test personnel before commencement of the specified work effort. At this time the QA representative/test director will have identified the applicable and nonapplicable observation items on USACEEIA Form No. 112-R and will delete and mark nonapplicable (N/A) those items inappropriate for his QA inspection observation items. These documents shall be used as master documents to mark, record, and identify discrepancies. Any discrepancies noted shall be recorded using yellow markings to record deletions of equipment, cables, or changes in schematic diagrams. All additions shall be recorded with red markings. Notes to the draftsman will be recorded in blue. Site documentation will be marked in the same manner. The designated installation agency representative will deliver a copy of the marked-up drawings to the onsite USACEEIA installation engineering element and in the absence of an engineer, to Commander, USACEEIA, ATTN: CCC-SED, Fort Huachuca, Arizona 85613, or as amended by the EIP. In all cases a complete set of marked drawings will be left onsite and maintained by the operating agency.

SECTION 7. OPERATIONAL TEST PLAN AND PROCEDURES

7.1 GENERAL. This section contains the test procedures and states the special conditions which apply to shakedown, checkout, and acceptance tests for the installed AN/TSQ-117. Onsite tests are performed to determine if the designated AN/TSQ-117 has been installed correctly, performs in accordance with the technical requirements of this SEIP and subsidiary documents, and is operationally suitable for the intended application.

7.2 TESTING.

7.2.1 Shakedown test and checkout. Functional tests will be conducted by the installation agency for the purpose of assuring that the equipment is aligned and operable and the installation is in accordance with the engineering documentation. These tests and checkouts will be conducted in coordination with personnel of the operating agency using the test plan identified in paragraph 7.2.2 and applicable technical bulletins and technical manuals available to the operating agency (the user). These tests will be conducted before the installation agency offering the installation for acceptance tests. As stated in section 6, the installation agency is to anticipate the installation completion date and notify the test agency of this completion not less than 10 days of scheduled date.

7.2.2 Onsite acceptance tests. Onsite acceptance testing will be accomplished in accordance with CCC-TED-75-TP-200. These tests will be preceded by a thorough QA inspection in accordance with the requirements of section 6. Tests will be conducted in a normal operating environment, as stated in TB 95-1. Abnormal ambient conditions (e.g., as temperature, humidity, or barometric pressure) during any test will be noted in the test log with detailed remarks included with the test results. The test director will determine if any re-testing is required. The operating agency will provide personnel to operate and maintain the equipment during tests. The installation agency will provide personnel to assist the test director in the conduct of tests and measurements.

7.2.3 Flight checks. Operational flight checks will be performed by Federal Aviation Administration qualified ATC personnel in conjunction with the acceptance tests and under the direction of the test director. Flight checks will determine whether or not the installed AN/TSQ-117 functions correctly and performs in accordance with individual equipment and system mission requirements. Copies of this report will be furnished to the participating agencies, included in the test report, and retained in project files.

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7.2.4 Test equipment. A complete listing of the required test equipment is contained in the appropriate technical manuals. The installation agency is responsible for assuring that the required complement of test equipment is available for installation, inspection, and test purposes. This test equipment should be available onsite from the operating agency.

7.2.5 Technical acceptance recommendation. Based on the QA inspections, QC reports and documentation, acceptance test results, and flight check results, the test director will determine the acceptability of the work effort. Before actual rejection, if the circumstances so warrant, the test director will attempt to coordinate his determination with the test agency and other cognizance agencies, as appropriate. The test director will prepare and distribute the TAR in accordance with the requirements of section 8. Preparation of the TAR will be accomplished onsite immediately following acceptance tests.

7.2.6 Test results. When one or more tests fail to meet requirements, the test director will determine which portions of the test was affected and which portions of the equipment or facility is to be retested. All deficiencies will be corrected or if not corrected, the deficiencies will be reported on the TAR and in the final test report.

7.2.7 Final test report. The test agency will prepare and distribute a test report in accordance with CCCR 702-2 as amended by the individual EIP and tasking documents. Copies of the completed TAR and flight inspection report will be included.

SECTION 8. COMPLETION CERTIFICATION

8.1 GENERAL. The results of the QA inspections and acceptance tests specified in sections 6 and 7 will be documented onsite by the QA representative/test director using HQ CEEIA CCC-TED-QA Form 98-R (fig. 8-1). The purpose of this form is to record the significant project information to include the scope of the effort, results and conclusions of the requisite inspections and tests, exceptions to the technical requirements, and recommendations regarding acceptance with or without exceptions or rejection of the work effort. The TAR also provides other participants to indicate agreement or disagreement with the inspection and test assessments and for user to state a willingness to technically accept the installed AN/TSQ-117.

8.2 DISTRIBUTION. A copy of the TAR will be provided to the signing participants and the operating agency. The original copy will be maintained in the test agency project files, but copies will be reproduced and included as a part of the test report.

8.3 WAIVERS. Waivers to include command approvals for individual installations will be recorded in the TAR and copies attached for the purpose of clarifying deviations from this SEIP, the individual EIP, and TB 95-1.

8.4 INSTRUCTIONS.

8.4.1 Technical acceptance recommendation. Entries on the data sheets are to be typed whenever possible. If a typewriter is not available, the forms may be completed by printing with black ink in block letters to provide a quality, fully legible product when reproduced. The instructions for completion of this form follow on a block-by-block basis.

8.4.2 Page identification. Pages are to be sequentially numbered to show both the individual page number and the total number of pages constituting the completed TAR. Additionally, each page will be identified by the date and project/contract number in the appropriate blocks.

8.4.3 Completion instructions. Instructions for completion of the TAR are outlined in the following subparagraphs and will be completed in accordance with these instructions:

a. Date (block 1): Enter the day, month, and year of completion for this action (e.g., 1/1/79 as the first day of the first month of 1979).

HQ CEEIA CCC-TED-QA FM 98-R
(Rev 1 Jan 79) Previous edition 27 Mar 78 is obsolete.

Figure 8-1. Sample form of technical acceptance recommendation (summary) (sheet 1 of 6).

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TECHNICAL ACCEPTANCE RECOMMENDATION (INSTALLED EQUIPMENT) (CCCR 702-2)		PAGE OF PAGES	
		DATE (DAY, MO, YEAR)	
PROJECT/CONTRACT NUMBER	TITLE	LOCATION	
MAJOR EQUIPMENT INSTALLED/RELOCATED			
BOM ITEM NO.	DESCRIPTION	PART NUMBER/FSN	QUANTITY

Figure 8-1. Sample form of technical acceptance recommendation (summary) (sheet 2 of 6).

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TECHNICAL ACCEPTANCE RECOMMENDATION (DOCUMENTATION) (CCCR 702-1)		PAGE OF PAGES
		DATE (DAY, MO, YEAR)
PROJECT/CONTRACT NUMBER	TITLE	LOCATION
PROJECT DOCUMENTATION PROVIDED		
REFERENCE DOCUMENTATION	TITLE	NO. OF COPIES

Figure 8-1. Sample form of technical acceptance recommendation (summary) (sheet 3 of 6).

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TECHNICAL ACCEPTANCE RECOMMENDATION (EXCEPTIONS) (CCR 702-2)		PAGE OF PAGES
		DATE (DAY, MO, YEAR)
PROJECT/CONTRACT NUMBER	TITLE	LOCATION
EXCEPTIONS		SUGGESTED ACTION AGENCY
ENGINEERING	INSTALLATION OTHER	

Figure 2-1. Sample form of technical acceptance recommendation (summary) (sheet 4 of 6).

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[illegible]

Figure 8-1. Sample form of technical acceptance recommendation (summary) (sheet 5 of 6).

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TECHNICAL ACCEPTANCE RECOMMENDATION (CERTIFICATION)		PAGE OF PAGES
		DATE (DAY, MO, YEAR)
PROJECT/CONTRACT NUMBER	TITLE	LOCATION
<p align="center">CERTIFICATION</p> <p>Acceptance tests and Quality Assurance Inspections are complete for equipment installed under this project.</p>		
WITHOUT EXCEPTIONS <input type="checkbox"/> WITH NOTED EXCEPTIONS <input type="checkbox"/>		
INSTALLATION AGENCY	SIGNATURE AND TITLE	
	PRINTED	
OPERATING AGENCY	SIGNATURE AND TITLE	
	PRINTED	
TEST AGENCY	SIGNATURE AND TITLE	
	PRINTED	
<p align="center">ACCEPTANCE</p> <p>Equipment herein certified successfully installed and tested, is accepted.</p>		
OPERATING COMMAND	SIGNATURE	
	TITLE	

Figure 8-1. Sample form of technical acceptance recommendation (summary) (sheet 6 of 6).

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- b. Project/contract number (block 2): Enter the appropriate project or contract number. If this is a subproject or part of a subproject, provide all necessary information (i.e., IIP milestone numbers, subproject numbers as well as subdivisions to same).
- c. Title (block 3): Enter the project name or title.
- d. Location (block 4): Enter the geographic location where the project was installed.
- e. Facility (block 5): Enter the name of the facility and other pertinent identifying information.
- f. Test director (block 6): Enter the name, title, and grade of the test director or QA representative assigned to this project.
- g. Operating agency (block 7): Enter the name, symbol, and complete mailing address of the organization having operations and maintenance responsibility for this project, system, or equipment installation.
- h. Engineering agency (block 8): Enter the name, symbol, and complete mailing address of the organization having engineering cognizance and responsibility.
- i. Installation agency (block 9): Enter the name, symbol, and complete mailing address of the organization having been tasked to install the TAR materiel.
- j. Testing agency (block 10): Enter the name, symbol, and complete mailing address of the quality assurance and testing organization tasked for this project.
- k. Project description (block 11): Enter a brief and concise description of the project to which the TAR applies.
- l. Major equipment installed/relocated (block 12): List the major items of equipment installed or relocated in accordance with the project requirements. Enter the BOM line item number, material description, assigned part number or federal stock number, and the quantity of each major item. Components, assemblies, and sub-assemblies configured into a major item as listed in SB 700-20 should also be recorded. Additional pages, numbered in sequence, may be added as required.
- m. Documentation (block 13): Enter the document identification (i.e., drawing number, technical manual number, etc.), title, and the

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quantity of each document provided to the operating unit as part of the project.

n. Exceptions (block 14):

(1) Upon completion of installation and testing, any exceptions to the project requirements, which require corrective action, will be listed. Include complete identification of each missing item. Exceptions must be based on the specified requirements of the project, supportable through the test results or other valid documentation, fully described, and precisely identified.

(2) The appropriate exception block must be annotated and separate sheets should be used for each category of exception.

(3) The test director will also enter the suggested action agency for each exception, recognizing that the test director may not always be in a position to determine the final action agency.

(4) For facilities that are becoming partially operational, identify installation agency actions remaining for project completion. In this situation, the TAR will show the tests that have been made, but will be identified as a partial record. A final TAR will be prepared after installation and testing of all remaining project equipment.

o. Remarks (block 15): The remarks section may be used to provide any additional information on or in support of a recommendation, commendation, or criticism in relation to the project installation, engineering, or testing. Entries may include the following:

(1) Shortcomings which do not require corrective action (not considered an exception).

(2) Recommendations for improving projects of a similar nature.

(3) Identification of support items that have not been accomplished and a description of any activity in progress by the operating agency to satisfy the requirement.

(4) A description of test results with the performing agency and dates accomplished.

(5) A statement to the effect that the installation agency will forward final as-built drawings when completed.

(6) A description of the ac power system with identification of source and backup capability.

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(7) A statement to indicate that a list of excess material was provided the operating command for final disposition or to identify material that was excess to the project.

p. Certification (block 16): Enter the signatures and certification that the project was installed, tested, and accepted for operation with or without exceptions as applicable.

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SEIP 027

(CCC-CED)

FOR THE COMMANDER:

OFFICIAL:

R. K. BOWERS
Colonel, Signal Corps
Deputy Commander



MERTON M. K. CHUN
Lieutenant Colonel, Signal Corps
Executive Officer

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- 10 - US Army Signal School, ATTN: ATSN-CD-MS, Fort Gordon, GA 31905
- 5 - US Army Air Traffic Control Activity, Fort Huachuca, AZ 85613
- 2 - US Army Materiel Development and Readiness Command, ATTN: CCN-PI-P, Washington, DC 20315
- 5 - 5th Signal Command, APO NY 09056
- 5 - 7th Signal Command, Fort Ritchie, MD 21719
- 3 - US Army Communications Command, ATTN: CC-OPS-PT, Fort Huachuca, AZ 85613
- 2 - US Army Training and Doctrine Command, ATTN: ATCE, Fort Monroe, VA 23351
- 2 - US Army Forces Command, ATTN: AFCE, Fort McPherson, GA 30330
- 2 - Defense Communications Agency, Technical Library Center, Code 205, Washington, DC 20305
- 12 - Defense Documentation Center, Cameron Station, Alexandria, VA 22314
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This standard engineering installation package is based on the most current thinking at US Army Communications Command. Your experience and help can improve our responsiveness in this area. Please send us your comments. Thanks.

Comments on SEIP ____ (please give number)

SEIP MGT Officer
AUTOVON 879-6719

How can we contact you?

Rank	Name	Duty position	Duty station	AUTOVON number
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